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The Course of Study

A MONTHLY PUBLICATION FOR TEACHERS AND PARENTS

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The Chicago Institute

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PARKER'S How to Study Geography.
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PARKER'S Uncle Robert's Geography, Parts I, II, III, IV.

JACKMAN'S Nature Study for Common Schools.
JACKMAN'S Nature Study and Related Subjects; Part I, Charts; Part II, Notes.
JACKMAN'S Nature Study Record for the Common Schools.
JACKMAN'S Field Work and Nature Study—Illustrated.
JACKMAN'S Nature Study for Grammar Grades.

RICE'S Course of Study in History and Literature.
RICE'S Outlines of History and Literature.
RICE'S Syllabus of Work in History and Literature.

COOKE'S Nature Myths and Stories for Little Children.

ATWOOD (In collaboration with Prof. Rollin D. Salisbury) The Geography of the Region About Devil's Lake and the Dalles of the Wisconsin, with Some Notes on its Surface Geology.

ATWOOD (In collaboration with Prof. Rollin D. Salisbury) Drift Phenomena of the Devil's Lake Region—Journal of Geology, 1897.

These publications may be obtained in the Institute Book-Room.

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THE COURSE OF STUDY

A PUBLICATION FOR TEACHERS AND PARENTS

ISSUED MONTHLY—TEN NUMBERS A YEAR.

Geography

Zonia Baber Wallace W. Atwood

Since steamboats, railroads, cables, and telegraphs have almost eliminated distance, man is brought into daily contact with evidences of the different peoples and products of the various parts of the globe. The entire world has become the environment of civilized man. His ability to rightly appreciate, enjoy, and adapt himself to his environment depends upon his knowledge of humanity and of natural law. And it is only by immediate intellectual contact with humanity and the forms and forces of nature that the appreciation of each in its true relation is obtained.

The ability to interpret the meaning of the surrounding landscape and of the world's landscapes makes travel and study a delight; and it is through the sympathetic study of one's own and of foreign peoples that the kinship of mankind is established.

There can be little appreciation of historical events without a knowledge of the geographical stage on which they were enacted. Not only the industries and habits but the condition and appearance of the present peoples of the world are largely due to their geographical environment. The study of geography, then, broadens man's horizon from his immediate neighborhood until it encompasses the entire earth; while geology discloses former geographies, one landscape passing, as in dissolving views, into another. The knowledge of mineralogy, paleontology, meteorology and botany gives detail and definition to the changing scenes.

In the Chicago Institute, throughout all the work, from the lowest grade through the pedagogical school, opportunity will be given, so far as is possible, to witness the processes of landscape-making, — as the action of rivers, wind, frost, rain, waves, currents, vegetation, animals, man, etc., on the earth, as well as the results of the previous work of earth-shaping forces.

Excursions for the purpose of observing man in his struggle to adapt natural forces and objects to his needs, in the cultivation of the soil, the raising of cattle, the felling of forests, quarrying, mining, building of roads, bridges, houses, transportation of commodities, etc., will be made.

The out-of-door and indoor laboratories will be used in the illumination and solution of problems which the field trips and other work suggest.

The following is a general outline for the year's work in the elementary and secondary schools.

FIRST GRADE: In the First Grade during the year field trips to the lake shore, sand dunes, swamp, river, woods, farm, park, zoölogical garden, conservatories, large fruit and vegetable stores and museums, will give an opportunity for a variety of geographical impressions.

SECOND GRADE: The First Grade work will be continued during the second year, and where field trips are impossible, the children will be introduced to other forms of land and water, as mountains, islands and seas, through stories, pictures and models.

THIRD GRADE: Advantage will be taken of the child's interest in steamboats and railroad trains, in the study of the commerce of this city. His desire to reproduce will find satisfaction in building a miniature city. The making of the streets, kinds of pavements, building of houses, street railways, manner of supplying the city with water, light, and heat, the problems of transportation, and the distribution of food and clothing will be treated so far as the subject appeals to the children. The source of much of the food will be found on the farm, where certain phases of its manner of production will be observed.

FOURTH GRADE: The Fourth Grade pupils will continue the work of the Third in tracing to their original homes certain peoples who compose this city, as the Chinese, Italians, and Norwegians. In the consideration of peoples, the young children are interested in the life of other little children, not in the doings, social and political, of grown people. They care to know of the home life, the food, clothing, games, and the school life of the foreign children of their own age; while the higher grades will respond to certain phases of the actions of mature men and women.

They will study the regions which have supplied this city with its building material, food, and clothing, studying the seas and lakes as highways and sources of food supply; considering islands as valuable reliefs in the sea, and giving the simple story of their formation; studying Hawaii as a type of volcanic formation; Bermuda as a coral island; and Cuba as a continental island. The study of coal and of the common metals—iron, gold, silver, copper, tin, and lead—will lead them to the subject of mining.

In the study of the forests of the cold, temperate, and tropical climates they will find the source of the useful woods, foods, and other products in daily use. The domestic animals and the wild animals seen in the zoölogical garden will be traced to their normal habitats.

The pupils will get acquainted with the common building-stones and examine accessible quarries.

FIFTH GRADE: The cause of the general topographical appearance of the landscapes in this region will be found in the study of glaciers. In studying the continent of North America, the ideas of typical geographic areas considered in the previous grades will be correlated, so as to give a picture of the continent as a whole.

SIXTH GRADE: In the Sixth Grade the horizon of interest will be broadened by a study of Eurasia and South America, illuminating the changing landscapes in those countries by the results of a closer examination of the human and physiographic conditions in this locality. Special intensive study will be made of regions which have produced great historic peoples, as China, India, Persia, Palestine, and Europe.

SEVENTH GRADE: A study of Africa, Australia, the islands of the world, and the oceans, will bring the general impressions of the entire earth within the horizon of experience.

EIGHTH GRADE: As the pupils develop in power, a closer study will be made of the subjects under consideration. The accessible regions which have been receiving attention in all the lower grades will present to the Eighth Grade new phases of physiography, geology, mineralogy, meteorology, and political and social conditions.

Basing their work upon the study of streams in this region, they will classify the important rivers of the world as to their influence as land-changing agencies and their influence upon civilization.

The distribution of the world's great mountain systems, its deserts, prairies, and forests, and their effects upon human progress, together with the distribution of the great nations of the earth, with their elastic boundary lines, will receive special attention.

NINTH GRADE: The work of the Eighth Grade will be continued in the ninth year, with a special study of all the physiographic processes and results in this and other parts of the world.

TENTH GRADE: In the closer study of meteorology, the observation and study of the weather conditions in this locality and of the world will be organized; while paleontology will broaden the knowledge of the present life.

ELEVENTH GRADE: In the eleventh year the broad questions of the formation of the world and the changes which have occurred will be considered in the study of general geology.

TWELFTH GRADE: The influence of geography, geology, and meteorology upon the present inhabitants of the earth will be considered in the twelfth year, with a special study of peoples of primitive civilization who now inhabit the earth.

Throughout all the grades simple geological problems, germane to the subject of study, will be considered.

Physiography of the Land

TENTH GRADE: Field trips will be taken each week, as long as the weather permits, and the indoor work will be developed from the field observations. Lantern slides, pictures, maps, and models may also be used.

III. Land forms resulting from stream work.

1. Valleys: (*a*) In youth, (*b*) in maturity, (*c*) in old age.
2. Alluvial cones and fans. Develop story of waste-filled basins of the world.
3. Flood plains. When does development begin? Study of Louisiana region. Settlement and occupation of flood plains.
4. Terraces. Why and when developed?
5. Bars and islands.
6. Deltas. Work out detailed structure in laboratory.

IV. Effect of unequal hardness of material upon valley development.

1. On shapes of valleys.
2. On development of rapids.
3. On development of falls.

V. Accidents to streams.

1. Through piracy. Causes for and examples of.
2. From rising of the land. Develop this from the story of the coastal plain of the United States.
3. From sinking of the land. Develop this from the story of the coastal plain of the United States.
4. From volcanic activities.
5. From glaciation. Find examples as near home as possible.

VI. Erosion history of a region read from its topography.

1. The signs of youth. Study shapes of valleys and of inter-stream areas.
2. The signs of maturity. Study shapes of valleys and of inter-stream areas.
3. The signs of old age. Study shapes of valleys and of inter-stream areas.
4. Rejuvenation. (*a*) causes, (*b*) changes in valleys resulting from rejuvenation.
5. Peneplains.
6. Cycles of erosion.

VII. The influence of the topography during the different stages of an erosion cycle upon the settlement and development of a region. This work will be based upon the study of certain areas, chiefly in the United States, where the

relationship of man to his geographic environment is clearly shown.

VIII. Underground water.

Field trip: Examine construction of well, sewer, or basement.

1. Source of underground water.
2. Condition in which it exists.
3. Depth at which it is found.
4. Movement of underground water as shown in springs, streams, and vegetation.

Laboratory experiments showing the amount of water exhaled from certain leaf areas.

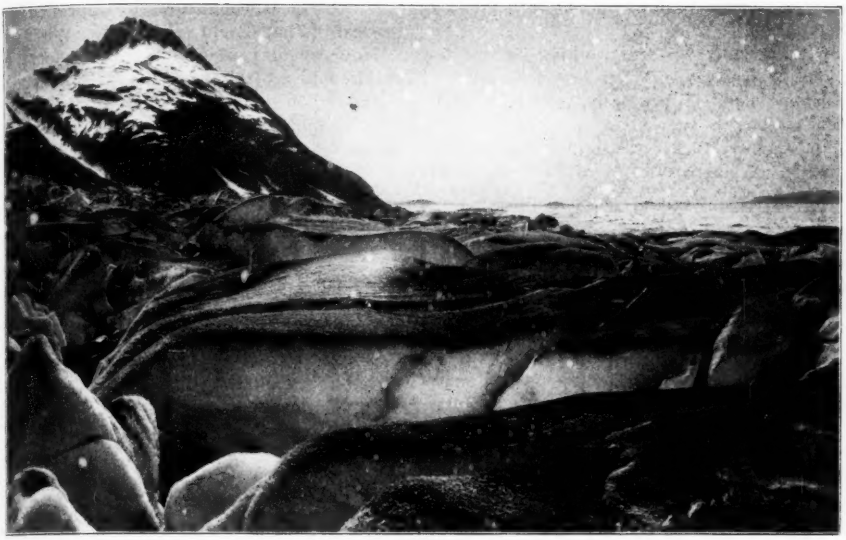
5. Effect of underground water on the structure of rocks.
6. Account for the differences in hot and cold springs? mineral and ordinary springs?
7. Formation of common wells; artesian wells.
8. Effect of underground water on topography. In what kind of country rock do sink holes occur?
9. Use of underground water to vegetation, animals, and man. Relation to permanent streams.
10. Relation of caves to underground water.
11. Location of the noted cave regions of the world. Account for their presence.
12. Use of caves to animals; to man.
13. Relation of caves to architectural development.

IX. Study of shore lines.

1. The work of waves.
   - (*a*) erosion.
     - (1) cliffs.
     - (2) cut terraces.
     - (3) caves.
   - (*b*) transportation.
     - (1) by waves.
     - (2) by undertow.
     - (3) by shore currents.
   - (*c*) deposition.
     - (1) built terraces.
     - (2) brack ridges.
     - (3) barriers.
     - (4.) spits.
     - (5.) bars.
     - (6.) hooks.
     - (7.) loops.
2. Recognition of ancient shore lines.

References: Davis, *Physical Geography*; Mill, *Realm of Nature*; Geikie, *Elementary Lessons in Physical Geography*; Salisbury, *Physical Geography of New Jersey*; Salisbury and Atwood, *Physical Geography of the Devil's Lake Region*; Russell, *Rivers of North America*.

MUIR GLACIER



CREVASSE, MUIR GLACIER

Third Year, High School

GENERAL GEOLOGY FOR NOVEMBER.

The October work in this course covered what is generally known as *dynamic geology*, including the study of those agents which have always been at work bringing about geologic changes and which may now be studied in the field. This month the general subject will be *structural geology*, and with the work will be associated the study of regions where the different geological structures exist.

V. The rocks of the earth's crust.

1. Igneous rocks.
2. Sedimentaty rocks.
3. Metamorphic rocks.

Familiarity with the common rocks of the region should be secured in the field and laboratory.

VI. Igneous rocks.

1. Original positions.
2. Present positions.
3. Structures common to igneous rocks.
4. Metamorphism of igneous rocks.

VII. Sedimentary rocks.

1. Original positions. Where are there any being formed to-day?
2. Conditions for the building of
   (*a*) sandstones, (*b*) limestones, (*c*) conglomerates, (*d*) shales, (*e*) coal.
   How can we account for a series of the above formations, each one lying conformably on the one beneath?
3. Present positions of sedimentary formations.
4. Folding, faulting, and fracturing.
5. Cleavage, joints, and mineral veins.
6. Metamorphism of sedimentary rocks.

VIII. Unconformity.

References: Scott, *Introductions to Geology*; Geikie, *Text-Book on Geology*.

Pedagogical School

I. Glaciers.

Field trips to Stony Island and Glencoe. At Glencoe note:

1. Topography of the regions visited and of adjacent regions.

a. Materials that compose the landscape; 1. Clay, sand, gravel; bowlders; shape, condi-

tion and variety of bowlders. 2. Source of material.

b. Agents at present working on this region.

Stony Island: Topography, relative to adjacent regions.

1. Country rock: *a*. Kind; geological formation. *b*. Nature of surfaces; how produced?

II. Location of existing glaciers.

1. In mountains: Alps, Himalayas; Rockies, Andes, Caucasus, Scandinavia, New Zealand. Cause?

2. Polar regions. Cause?

3. Meteorological conditions favorable to the production of glaciers.

4. Appearance of glaciers, including snow fields: *a*. materials; *b*. crevasses—cause; *c*. detritus: 1. source; 2. transportation.

5. Movement of glaciers: *a*. evidence of; *b*. effect upon ice; upon surface passed over.

6. Moraine: *a*. Location in relation to glacier; *b*. material; *c*. topography of drift.

7. Fluvial association: *a*. Surface streams; *b*. basal streams; *c*. effect on associated detritus.

III. Location of extinct continental glaciers.

1. Topography of glaciated region where drift is present? where absent?

2. Relation of lakes of North America and Europe to glacial history.

3. Movement of glaciers. Relation to preglacial valleys.

4. Proofs of different glacial epochs?

5. Effect of continental glaciation on the present industrial condition of affected areas.

Was the glacial epoch beneficial or detrimental to the portion of the United States so affected? What would have been the result had the glacier reached to the Gulf of Mexico? What would be the condition here had the glacier period not occurred?

IV. In what grade would you introduce the study of glaciers if you lived in a glacial region? In a non-glacial region? Why?

What aspect would appeal to the different grades? What should be ignored? Why?

How would you introduce the subject to children in a glaciated region? In a nonglaciated region?

What laboratory experiments, pictures, models, literature would aid the pupil in the study of this subject?

Give plan for teaching the subject to the grade you would like to teach.

References

Russell, *Glaciers of North America;* Geikie, *Ice Age,* Text-Book on Geology; Davis, *Physical Geography; Journal of Geology,* Vol. I-IV; Salisbury, *Physical Geography of New Jersey;* Scott, *Introduction to Geology;* Davis and Shaler, *Glaciers.*

V. Underground water.

For detailed outline, see outline for first year high school.

In what grades should this subject be introduced? Why?

What would be the motive for teaching underground water?

What experiments in chemistry and physics would the teaching necessitate?

What expression on the part of the pupil in drawing, painting, modeling, and making would the teaching necessitate?

Give brief plan for teaching the subject to some grade.

References

Shaler, *Aspects of the Earth;* Shaler, *Brief History of the Earth;* Indiana Geological Reports; Scott, *Introduction to Geology;* Geikie, *Text-Book in Geology;* Dana, *Text-Book of Geology;* Geikie, *Elementary Lessons in Physiology;* Tarr, *First Book in Physical Geography.*

NOTE.—Owing to readjustment of the school program, the courses in meteorology and anthropogeography have been discontinued. If readers desirous of following these courses will address the COURSE OF STUDY, their relationship with the Institute instructors may be continued through correspondence.

Unity in Ideal and Motive

SYLLABUS FOR FACULTY DISCUSSION,
WEDNESDAY, OCTOBER 17, 1900.

Francis W. Parker

I. THE IDEAL.

(a) An ideal school is an ideal community.

(b) An ideal community is that condition of society in which the educative activities of each member are fully and completely engaged.

(c) The end and aim of educative activities is to make the community ideal; that is, the activity of each member of the community is concentrated upon complete living.

(d) The members of the community concentrate upon that work, play, and rest which fills the day with the highest and best life—life that means continuous growth and development of the individual and of the community.

II. ORDER.

(a) Order means the help that one member of the community gives to all the other members. When each member of the community (including the teacher) gives the best help for the good of the community there is perfect order.

(b) Order is the most economical use of personal energy for the good of the whole.

(c) The sole function of the teacher is the organization of ideal community life, the development of sound public opinion.

(d) All rules needed for the government of the community should be the outgrowth of the most careful and thorough deliberation on the part of its members.

(e) The faculty of the school necessarily takes the initiatory steps in such rules.

(f) Each teacher, pupil, and student is responsible for the order of the whole school to the limit of his personal ability.

(g) The harmony of a school means the comprehensive understanding and complete application on the part of each of the rules thus made. The exercise of that charity and courtesy which is intrinsic in the best individual life is the beauty of community life.

III. The teacher is a model citizen of a school community.

1. Every teacher should be a model housekeeper, taking the best care of books, apparatus, and all materials, and exercising always that economy which is needed for the highest efficiency.

2. The teachers should be prompt in the performance of their duties, prepare for every recitation, attend all meetings; in fact, do what they require their pupils to do; for instance:

3. The teachers should attend the morning exercises and join heartily in them, so as to give a strong impulse to a good day's work.

4. Whenever there is a request for a report, a question to be answered on paper, an outline or syllabus to be made, it should be done promptly in the best possible manner and on time. This rule should be obeyed without fail, sickness or other unavoidable disabilities alone preventing.

5. All the rules and regulations of the school should be strictly and impartially carried out by each teacher.

IV. CONCENTRATION OF EFFORT.

Educative concentration is the bringing to bear of all the powers of the mind and the soul upon the one ideal of citizenship, community life, complete living.

1. There should be full, hearty, and complete recognition, approval and indorsement on the part of each teacher of the value of every other subject of thought or skill that is taught in the school.

2. This recognition can be brought about in various ways:

(a) By constantly drawing upon the knowledge and skill gained in other departments and other grades, and so calling attention to their use and relation. For instance, how absolutely necessary a knowledge of geography is to the study of history. Use history in teaching geogra-

phy; science in teaching all subjects; different modes of expression to reënforce thought, and mathematics for accuracy and clearness of thought.

(b) By questioning pupils closely to find out what power they have gained in other departments or grades.

(c) By indorsing cordially and warmly in all class-work every related subject, thus leading to its use in correlation with the subject in hand.

V. Each teacher should be the active, energetic assistant of every other teacher.

1. Each teacher should try to get clear and distinct ideas of the relative value to his own subject of all other subjects.

2. To this end, each teacher should visit and inspect the work of all the faculty. They should visit classes whenever possible. The least depreciation of the work of another in the school has a malign influence.

3. Each teacher should make genuine, open, and frank criticisms to the teacher whose work seems open to criticism, and should bring the criticisms, when necessary, before the faculty. All differences of opinion should be brought before the faculty.

4. A teacher should be careful not to give snap judgments or opinions that are not supported by the soundest principles.

NOTE. — A specialist is generally modest, careful and cautious in regard to the subject which he is really studying, but too often confident and presumptuous in regard to subjects of which he knows little or nothing. A teacher may succeed in one subject, and through his success feel that he is competent to judge all others. Thus many teachers hinder growth by not recognizing the value of subjects they have not studied. If there is a subject taught in the school which is not of intrinsic value, both in itself and in its relations to other subjects, the teaching of that subject should be criticised and its weakness exposed in faculty meeting.

VI. Each teacher should make every other teacher his active, energetic assistant.

1. The teacher of a subject should use all possible means at the weekly meetings, and in all his teaching, to permeate the faculty with the value of what he is teaching.

2. He should present the principles and methods of his subject, explain and defend them.

3. He should criticise the work of the school, and show where, in his opinion, his subject is not used to the best advantage.

4. He should get all the teachers in the faculty to assist him in his particular teaching. For instance, the teacher of writing should insist in every possible way that every other teacher should be also a teacher of writing. The same may be said of drawing and painting, and, in fact, of all subjects. The teacher of psychology should see that the fundamental laws of mental action are followed in their application and educative work. It will be understood that none of these ends can be brought about by command or by fixed rules. Each teacher must get every other teacher to assist him because he has the power to make the others understand the intrinsic value of his work.

VII. Modes of expression and physical training.

1. Every teacher should be a teacher of physical training. He should see that his pupils are in the best possible condition for mental and moral action. The air, the seats, the general hygienic conditions should be the care of every teacher, and physical exercises should be used whenever and wherever needed.

2. Teachers of whatever department or grade should be persistent and successful teachers of speech and all that pertains to it; of articulation, punctuation, melody and harmony of language; should be keenly alive to any defect, physical or mechanical, of oral language that obstructs the expression of thought.

3. Every teacher should be an indefatigable teacher of grammar, of correct language both in speech and writing; should discover the idioms that pupils use incorrectly, and use the best means to destroy bad habits in language.

4. Every teacher in reading should give constantly pedagogical instruction in oral reading whenever and wherever it is necessary.

5. The same may be said of all other modes of expression. The teacher should require the best possible penmanship at all times; should use drawing, modeling, painting, and making whenever necessary.

6. The teacher should strive to improve himself in each and all of the modes of expression. He should be constantly practicing in order to enhance skill.

7. The teacher should have excellent taste in all the modes of expression; should follow constantly the great fundamental law of ease; should be able to discriminate between the intrinsic expression of thought and the mere imitation or copying of forms of expression.

8. Every teacher should appreciate the pedagogical benefits of music; should bring it in whenever needed.

9. However unskillful the teacher may be in any mode of expression, he should at least indorse highly and strongly that mode of expression as a potent means of education.

NOTE.—If thirty teachers in the school should join heartily in the teaching of penmanship in the best possible way, and the thirty-first teacher should be indifferent to the teaching of writing, it would be impossible to have the best writing in the school, for pupils will, as a rule, unconsciously indorse the teacher allowing poor work.

VIII. Child Study.

1. The greatest good that can possibly come out of the united study of the faculty is the presentation by teachers of thorough, careful, and scientific studies of individual pupils.

2. When several teachers are teaching the same pupils, a comparison of notes concerning individuals is of great value.

3. Physical defects should be discovered as soon as possible.

4. Mental diseases induced by wrong education should be thoroughly diagnosed and then discussed by the faculty.

5. The motives of pupils should receive the most thoughtful attention.

6. The invariable rule is that the better you understand a pupil, the better you are able to teach him. Each member of the faculty studies a pupil from a personal standpoint; thus the opinions of all furnish the best basis for a correct diagnosis.

IX. Pedagogical contributions of each teacher.

1. Each teacher is in his laboratory (classroom) day by day, constantly studying, examining, inspecting, watching the movements of his pupils, constantly preparing lessons and determining their outcome. He must, therefore, make continual discoveries, discoveries of principles, of methods, of details.

2. No teacher can teach a day without making observations which are of intrinsic value to all the faculty.

3. It follows, then, that each teacher should form a habit of contributing all he knows to the whole faculty in the faculty meetings or in private conversations.

Psychology

Francis W. Parker

Students are again reminded that the study of psychology demands persistent, careful, and prolonged examination of the facts in consciousness. Hitherto we have studied, with some degree of success, the world external to consciousness. Now has come the time, if we are able, to study our internal invisible world, the mind.

The beginnings of psychology are to most persons obscure and confusing. It is a long and very important step from the observation of external objects to the perception of subject-objects, or images. Such study requires steadiness of will, reliance on self, and perseverance through obscurity to clearness.

The purpose in the beginning is to give students many points from which to start investigations—points adapted to the abilities of different students. It is not necessary for every student to pursue the same line; in fact, it is well for each student to pursue the line that appeals to her, and then contribute the results for the good of the whole class.

Read carefully over again the "Suggestions," Vol. I, No. 1, COURSE OF STUDY, and "Suggestions," Vol. I, No. 2. Hold your-

self in readiness to answer questions such as the following:

How many and what lines of investigation have you followed?

What inferences have you made? State the facts from which you draw the inferences. Images acquired outside of school study? Images acquired in school? Of which have you the more? Which are the more valuable? What is the test of the value of an image? Is an image knowledge? Why? Why not? What is the conscious basis of all description? Describe experiences. Describe a book you have read. Take each study you have pursued in school —geography, history, etc.—and ascertain what remains to you of each study. What part of the knowledge you have acquired consists of images? If you have no images of a subject, for instance, an epoch of history, what knowledge have you of that epoch?

What are the external causes of images? —visual, auditory, tactile, motor.

Classify objects in relation to their effect upon consciousness.

What is reading?

What experiments have you tried in order to ascertain what goes on in consciousness when you read?

What is the function of a word? Experiments? Of a sentence?

What is the difference between the function of a word and the function of a sentence?

What happens in consciousness when a word is learned?

Hold images in consciousness and make many experiments with them.

Recall what happened when you were holding images.

State any external means by which you were assisted in holding images.

Holding images assisted by the action of external objects is ATTENTION.

There are three modes of attention named by the action of different classes of objects. What are they? Define each mode.

Can you hold images without the direct and immediate action of external objects? Experiment.

What goes on in consciousness when you analyze an object?

Recall your daily lessons and note what changes have come about in your minds.

Pedagogics

Make a special study of IX, "The Recitation," Vol. I, No. 1, p. 24. Take the syllabus sentence by sentence, and verify or reject. Be ready to give reasons why. If the statements seem true to you, realize them in your classes. A frank statement of ignorance may require courage, but such a statement would assist all your classmates. How?

Class Notes on Psychology

Taken by Angeline Loesch

Division I

T stands for the Teacher, Colonel Parker —C for the Class.

T. The laboratory for Psychology is your own mind, i. e., consciousness. Try an experiment. Think of the house you first lived in. How many have had an experience? Describe it.

C. I could see a broad hall with a staircase. I could see a small, brown painted house set in among the trees.

T. "I see" means that I am conscious of something. That something of which I am conscious is in my consciousness.

Experiment: Ink-bottle held up before the class.

T. What is happening now?

C. I see the ink-bottle.

T. Is the ink-bottle in your consciousness?

C. Yes—no, not the bottle itself, the picture of it. Same fact found to be true of chalk, box, watch.

T. Can you give an account of your earliest childhood memories? What are those memories? Images? What have you left from your study of geography? Images? Of what?

C. Of places. Of maps. Of pages in the book.

T. Can you place yourself on the Acropolis and look south? North? On Pike's Peak?

Descriptions showed that the students held vague images—for the most part incorrect.

T. What is left from your study of history?

C. Images of pages in the book.
Of places.
Of events.

T. But events are images of places and people. What would be a working knowledge of the history of the United States?

C. A series of related images from the beginning to the present time.

T. What is left from a novel?

C. A series of images.
But from history, or a novel, long after images are gone, principles are left.
Can you think without images? How about dreams? Are there not images then and no thought?
Feeling comes with images.

T. Before or after?

C. Can you have images of which you are not conscious? i. e., what of habits; of automatic acts?

T. Might some images be so short that it would be almost impossible to remember their presence? Are not automatic acts preceded by images of movement?

Experiment: Watch held up before class.

T. Does this object act on, i. e., change your consciousness?

C. Yes.

T. Does your consciousness act on, i. e., change the object?

C. No, object remains the same.

T. What are the occasions of conscious images?

C. In general terms, objects. In particular, vibrations of ether, i. e., external color; vibrations of air, i. e., sound.

T. Four kinds of images, visual, auditory, tactile, motor. Tactile has the advantage over other senses because its end-organ is the whole surface of the body. Objects are acting on us and we have the products in our consciousness, the images corresponding to those objects. Can you have an image of an object you have never seen?

C. Yes, when you read.

Experiment: The word "goose" written on the blackboard.

T. Is the written word a material object?

C. Yes, because it is made of material, has length, breadth, and thickness.
No, because it is intangible; one cannot take hold of it.

T. Then a star is no object. The spoken word is also an object. It has been photographed. Conclusion: everything external to us, except another consciousness, is an object.

Division II

T. "I see" means that I am conscious of something. That something of which I am conscious is in my consciousness.

Experiment: hat shown.

C. Not hat, but image of hat, is in my consciousness.

T. "I hear" means I am conscious of something.

C. Are sounds images in consciousness?
Are results of education images?
Results of education are more than that. The feeling of inspiration to do, responsibility, a moral effect, is left besides images.
Why do you sometimes recognize after a few pages that you have read the book before?

T. Are images knowledge?

C. An image is not knowledge because the child has images of the moon, but calls them several moons. The image is right, the inference is wrong. Therefore an image is not knowledge.

Conclusion: Rightly related images are knowledge.

T. What have you left from Geography? Images? Examine and see if you have any real image of a place never seen by you. Have images gathered in school, or out, the more influence? What is the difference between in and out of school images as to number, vividness, and usefulness? Is there a state of consciousness without images?

C. Am I conscious when asleep? Is not fright a state of consciousness without images?

After fright you remember what you saw and how you felt; are they both images?

What is to be said about aches, for example, toothache?

Some aches are so bad you can almost see how they look.

T. Objects act on consciousness and create images.

Experiment: Word "pig" written on blackboard.

T. Is it an object?

Discussion and conclusion: Yes.

T. Does it create an image?

C. Yes.

But some words do not create images.

T. What if a man had no images except those which acted directly on his sense-organs?

C. Then he could not hear language, nor read.

T. What two great classes of objects act on consciousness?

C. Direct and indirect.

Words written and spoken are examples of indirect objects.

T. When an object acts continuously for some time on consciousness, what is the common name of the process?

Various answers given: Thought, concentration, education, learning, attention.

The name, observation, was not given, but attention, because it was so closely akin to observation, was discussed.

T. What is attention? What happens when you give attention?

C. When you give attention all other objects are driven out.

T. How can you drive out?

C. Only by filling in.

Attention is holding images in consciousness.

T. What happens when you hold an image?

C. Other images come in.

An image grows and becomes clearer when held.

Pedagogy

Bertha Payne

The teacher's function is to surround the children with conditions for growth. These conditions bring certain influences to bear upon the children; they react upon these influences in various ways. The kind of reaction is one test of the value of the influence. We look for certain kinds of response to the external influences. Among those that we count as fundamentally valuable are: Inquiry, attempts to make, art expression in all forms, and efforts at cooperation. The teacher herself is one of the conditions; yet she stands back of the conditions, and watches the reaction of the children to the influence. On the other hand, she may lead at times, may become a factor in directing their activity further than their own impulses would have carried them.

The problem that arises here is: "Where shall she lead and where follow?"

Experience furnishes the mental food: work and play are the modes in which experience is assimilated and turned into energy. Experience must be controlled by the teacher, that the right nutrition-substance may be furnished at the right time. Exercise in work and play must be directed into the most helpful and economical channels. The selection of experiences and consequent partial control of influences, together with the direction of energy in expression, is the teacher's function throughout the whole field of education.

If these principles hold true in regulating the relation of teacher and pupils—the youngest as well as with the oldest—their acceptance sweeps away all barriers between kindergarten and school; one educational law for the kindergarten and another for the first grade becomes illogical.

The only legitimate distinctions that can be recognized will be those called for by the stage of development.

What is a stage of development? If we should trace the growth of a child from infancy to adolescence, what periods of physical growth should we find? Are there any corresponding, or related, mental periods of development? Does a group of children in the kindergarten ranging in age from three to six years include more than one stage of growth? These are some of the questions that come up in investigating the typical conditions necessary for growth.

In the kindergarten the teacher's problem is just that of every teacher. She must study the children and study the conditions; she must find the fundamental needs and ways to satisfy them. She must learn to recognize the distinctive characteristics and needs of the children in certain stages and the peculiar traits and needs of particular children. After this she must plan an ideal environment for her little community. The children themselves are her laboratory. She can find little help apart from them save in the laboratory of her own consciousness. This inner field of investigation furnishes the type of all activity at all stages, but each stage has its own variations in the form of predominating images and impulses.

The limitation in the number and fullness of children's images is the determining factor in our choice of conditions for each group.

The impulses to act in certain ways partly determine the form of exercise which shall be guided by the teacher. Two questions follow: What are the controlling impulses to activity at three years and at six? What is the range of images and what have these images to do with action at each stage?

Pedagogics of Nature Study

Wilbur S. Jackman

Query: What is the relation of Nature Study to Natural Science?

In the earlier days of Nature Study in the elementary schools, men of science were strenuous in their protest against calling either the subject science, or its methods. The objections urged may have been valid in some degree against the crude or rudimentary methods employed in the beginning, but they cannot be successfully maintained against the study when properly conducted. Nature Study, well planned, is scientific, and it differs not a whit in its essentials from Natural Science. The obvious truth of this may be shown easily by a consideration of the matter and method in both.

1. In Natural Science the subject-matter is found in the great domain of nature; earth, air, sky, and water are the sources of the materials studied. Outside of these, in Natural Science, there is nothing to study.

2. In Nature Study the materials are derived from the same exhaustless realm.

3. In Natural Science the study rests upon the personal investigations of the student, and it is his own observations that measure the rate and amount of his progress.

4. In Nature Study, no less than in Natural Science, personal investigations and observations are fundamental.

5. In the study of Natural Science the senses are of primary importance.

6. In Nature Study, the use of the senses is no less essential.

7. In Natural Science the student seeks through a study of natural phenomena the law or laws that express the order of the whole.

8. Nature Study, properly understood, suggests to the youngest child some relationships that give a clue to law. The suggestion of law is the only natural stimulus in any study. The age of the pupil is irrelevant.

There is no natural dividing-line, therefore, between the student of Natural Science and the pupil in Nature Study. The motive, matter, and method in Natural Science and Nature Study are the same, but in instruction there are differences in the application of the common principles.

1. The child's senses are untrained; he observes less of detail than the better trained student of nature.

2. In Nature Study larger masses, therefore, must be presented to the child than would be necessary in the case of the advanced student. The sights must be more striking, the weights, relatively, heavier, the movements more pronounced, the functions more obvious.

3. In Natural Science the better trained student discovers minuter details and recognizes more delicate relations.

4. Hence to the beginner the outdoor study is of maximum and the laboratory is of minimum importance; but to the advanced student, if he can carry his outdoor experience with him, the laboratory becomes relatively of greater importance.

5. Quantitative results in Nature Study are possible and proper in any particular field of study where the student of Natural Science would find it necessary to obtain them. But where the advanced student might obtain the desired information by the analysis of a single leaf, or of a drop of water or an ounce of earth, the beginner in Nature Study must use bushels, gallons and pounds. This for two reasons: First, the beginner must deal with large quantities if he is to image properly; and second, the liability to loss during the experiment, owing to lack of skill in manipulation, is greater. True Nature Study, therefore, is Natural Science, and its methods are all scientific. The student in the latter should not find it necessary to unlearn, ignore, or forget what he learned in the former.

Physiology of Nutrition

Ira B. Meyers

(With Special Reference to the Human Body.)

Ninth Grade: The Physiology for the quarter is a study of the animal organism as related to nutrition.

The structure of the digestive organs of any animal is determined by the nature of the food consumed. The food material is more or less solid and insoluble, and is for the most part of a composition differing from the tissues it is intended to build or repair. The function of the organs of digestion is to change the food so that it may be utilized by the tissues of the body.

This series of changes involves two processes—a physical one by which the food is triturated, moved along the digestive tract, and mixed with certain fluids, and a chemical process which changes insoluble substances into soluble ones, thus modifying the food in such a way that the larger part eaten passes directly or indirectly into the blood.

To understand the problems involved in these processes, structure and function must be studied together. Knowing that an animal lives on solid food is sufficient to explain the need of teeth; knowing the physical nature of the food, and the animal's method of prehending it, explains variations in position, form, and size. That this solid food must be reduced to a liquid state explains the need of watery secretions, but to understand the action of these several secretions on the food demands a knowledge of the nature of the food-stuffs (proteids, carbohydrates, fats, minerals), and the effect of these secretions upon each class.

The effort in this course will be to trace the various relations of the digestive organs and their secretions to foods.

Materials used in the quarter's study: Skulls of dog, cat, sheep, hog, squirrel, man.

Models of stomachs of dog, cow, hog, man.

Microscopic slides showing sections of various glands, organs and tissues.

Manikin of the human body (Auzoux).

Dissection of small animal showing organs of digestion.

References: Foster, *Text Book of Physiology;* Martin, *The Human Body;* Colton, *Manual of Physiology;* Orton, *Comparative Zoölogy;* Atwater, *Chemistry and Economy of Food.*

U. S. Experiment Station Bulletin, No. 21.

Outline of Course

I. Prehension of food.

1. Various means in which animals seize their food.
2. Influence upon the animal's habits.

II. Examination of teeth of the various animal skulls.

1. Structure of teeth.
   (*a*) Variations in different animals.
   (*b*) Variations in the same animals.
2. Relation of lower to corresponding upper teeth.
3. Movement of lower jaw.
4. Mechanical effect on food of the animal.
5. Special study of human teeth.

III. Insalivation and swallowing.

1. Function of saliva. Salivary glands, location, structure. Rate of secretion.
2. Muscular action of tongue, cheeks, etc., in mastication.
3. Œsophagus. Structure, muscular action.

IV. Stomach.

1. Location. Structure, form, movement, secretions.
2. Food changes in stomach.

V. Intestines.

1. Structure, position, movements, secretions.
2. Food changes in intestines.

VI. Mechanics of absorption.

Chemistry

Alice P. Norton

Eleventh and Twelfth Grades: The course will be presented in a way to give a definite purpose to the chemical investigations. Individual work will be done and the special interests of each pupil considered.

The work for October and November will consist of:

I. The study of autumn fruits and leaves.

1. Determination of composition as to (*a*) Water. (*b*) Combustible substance. (*c*) Ash.

The amount of water present to be ascertained by weighing, drying, and weighing again. Comparison of amount of water in different fruits and in fresh and dry leaves; students to devise, if possible, a method for collecting and condensing the moisture driven off, part of dry substance to be preserved for future use. A weighed portion to be burned and the percentage of ash or mineral matter calculated. The ash to be preserved for future investigation.

2. Determination of amount of water that dried substance will take up under different conditions of time and temperature. Principle of stewing of fruits. Has fruit or leaf been restored to original condition? Why?

3. Study of water. Properties. Effect of heat upon it. Determination of boiling point and freezing point. Effect upon each of substances in solution. Analysis of water by electrolysis, and beginning of study of component parts.

II. The study will be used also as a means to show the nature of chemical change and to illustrate the province of chemistry.

Physics

Charles W. Carman

First Year, Pedagogic School: During the month of October an effort to make applications of the principles of Physics involved in the study of metereological phenomena developed the need of preliminary laboratory work and class-room discussion.

Accordingly the work for the present month has been arranged as follows:

THE BAROMETER. (a) The work of Torricelli and Pascal. (b) Classic experiments repeated. (c) Mercurial barometers. (d) The transmission of pressure through liquids. (e) "Lifting pumps." (f) Aneroid barometers. (g) Some laws of pneumatics. (h) Formula for measuring heights by means of the barometer. (i) Barometer readings on high buildings, water-towers, on the "high bridge" in Lincoln Park, and on the Ferris wheel, which is admirably designed for such an exercise. Readings made at the end of each minute during a revolution are not only interesting, but also furnish valuable data for studying the principles involved in the construction and use of the barometer. A curve constructed from such readings is very expressive.

THE THERMOMETER. (a) The laws of the expansion of matter, in its various states, applied to the construction of thermometers. (b) The same applied to meteorological changes. (c) The composition of the air. (d) The movements of the air. (e) Some physics involved in weather forecasting.

The Course of Study

It is the purpose of THE COURSE OF STUDY to present in theory and practice a full exposition of the work of the Chicago Institute in the Academic and Pedagogic schools. This exposition will be continuous, and will consist of outlines of the work done in all grades and departments, prepared by the teachers of the grades and departments. Issued every school month, there will be ten numbers a year, none appearing during the vacation months of August and September.

The COURSE OF STUDY will be at once the curriculum, guide, and text-book of the students in the Pedagogical School, and a means of preparation for all persons who propose to attend the Chicago Institute. It is also intended to meet the needs of those parents who care to know, month by month, the theory and details of the work of their children in the Academic School. Persons who wish to study the new education will find many practical suggestions as to the application of its fundamental principles to daily school-room work.

History and Literature

Emily J. Rice

(*Continued from October Number.*)

High School, Second Year

Mediaeval History: It is thought best to cover only the field of Mediæval History in the second year and Modern History in the third, including English History in these more general subjects. The usual plan is to go over the entire ground of Mediæval and Modern History in the second year and review this ground by the study of English History in the third year. We shall follow the general trend of European affairs in Mediæval times, and the great movements of the period. The history of France is the natural center of the work and will be made the basis of study, but emphasis will also be placed upon the development of the English government. The subjects suggested for October and November are the decline of the Roman Empire and the invasions of the Teutonic Barbarians.

Third Year

Modern History: This year's work will begin with the Renaissance and include in a general way the field of Modern History. We shall make an attempt to trace in this complicated period the economic, social, and political conditions that have had most influence upon our own times. Special emphasis will be given to the development of English institutions.

The subjects for October and November are the revival of learning and art, and particular attention will be paid to the discovery of America and the great movements in Renaissance Art.

Fourth Year

American History, Economics, and Civics: This year we shall consider some of the leading principles of economics and civics, and confine our work in history to recent times, and especially to subjects relating to our own country. The work will begin with observation and classification of the industries of Chicago and its trade relations.

The course outlined above has been arranged to continue throughout the four years, because any less extended work would in our opinion fail to secure the ends for which history should be studied. The course of one year in General History common in our schools gives the pupils an opportunity to do little more than memorize poorly digested facts. The result is that their tastes, feelings, and actions remain uninfluenced by their study. More time must be given to the subject in order that the pupils may gain such a knowledge of their social and political environment as will affect their habits of thought and action. A continuous course in history of four years, with related literature, was adopted in 1883 in the High School department of the Cook County Normal School, and the experience of several years proved its value.

The correlation of history and literature not only saves much time, but also adds to the effectiveness of each of these subjects. Since the ideals of man are expressed in literature, the use of this source of knowledge is necessary to any adequate conception of the character of an age. An ar-

rangement of literary masterpieces corresponding with historic epochs is also a great aid to the teaching of literature, for the background of history throws much light upon the meaning of essay, poem, or story. English composition, although taught with all the other subjects, will be especially related to literature ; and literary selections not correlated with history will be used whenever required for that work. It is thought, however, that the course in literature is sufficiently full to meet the demands of the department of English.

It is also intended to relate the work in history as closely as possible to art, geography, and the foreign languages. Economics and civics will be studied in connection with history rather than as separate subjects. To teach civil government mainly with history secures the best results, because the present form of institutions can be comprehended only by tracing their origin and growth. As far as possible, the work in history will be correlated with every other subject of study.

The following is a more detailed list of subjects, arranged by quarters and months, for the High School course. This is planned in a general way, as the work will be outlined for the monthly publication, but may be modified as occasion requires :

COURSE OF STUDY

First Year, Ancient History

First Quarter: Primitive Culture. Oriental Civilizations. Greece.

October: Primitive Culture. Mythology. Lowell's *Rhœcus, Finding of the Lyre, Shepherd of King Admetus,* and *Prometheus.*

November: Egypt. Mythology. Longfellow's *Prometheus, Pegasus in Pound,* and *Enceladus.* Tennyson's *Aenone.*

December: The Homeric Age. The Iliad. Longfellow's *Masque of Pandora.*

Second Quarter: Greek History.

January: The Spartans. The Iliad. Tennyson's *Lotus-Eaters* and *Ulysses.*

February: The Athenians. The *Antigone* of Sophocles. Tennyson's *Dream of Fair Women* and Byron's *Isles of Greece.*

March: The Age of Pericles. Plato's *Apology* and *Phædro.* Schiller's *Gods of Greece,* and Mrs. Browning's *Dead Pan.*

Third Quarter: Roman History.

April: Early Rome. Macaulay's *Lays of Ancient Rome.* Hawthorne's *Marble Faun.*

May: The Republic. Shakespeare's *Julius Cæsar.*

June: The Republic. Shakespeare's *Julius Cæsar.*

Second Year, Mediæval History

First Quarter: The Roman Empire.

October: Decline of Empire. *Meditations* of Marcus Aurelius.

November: Teutonic Barbarians. Carlyle's *Hero as a Divinity.*

December: Franks and Mohammedans. Carlyle's *Hero as a Prophet.*

Second Quarter: Mediæval History.

January: Charlemagne. The Saxons. Tennyson's *Idylls of the King.*

February: The Norman Conquest. Chaucer's *Canterbury Tales ;* the *Prologue.*

March: The Feudal System. Chaucer's *Knight's Tale.* Scott's *Ivanhoe.*

Third Quarter: Mediæval History.

April: The Mediæval Church. Shakespeare's *Merchant of Venice.*

May: The Growth of Towns. Shakespeare's *Merchant of Venice.*

June: The English Government. Shakespeare's *Merchant of Venice.*

Third Year, Modern History

First Quarter: The Renaissance.

October: The Revival of Learning. Shakespeare's *Macbeth.* Byron's *Childe Harold,* Fourth Canto.

November: The Revival of Art. Shakespeare's *Macbeth.*

December: The Reformation. Shakespeare's *Macbeth.*

Second Quarter: Modern History.

January: National Governments. Milton's *Minor Poems.*

February: Political Revolution. Macaulay's *Essays on Milton and Addison. The Sir Roger de Coverley Papers.*

March: Political Revolution. Selections from poems of Burns and Carlyle's *Essay on Burns.* Coleridge's *Rime of the Ancient Mariner.*

Third Quarter: Modern History.

April: The French Revolution. Selections from Wordsworth. Dickens' *Tale of Two Cities*, or Goldsmith's *Vicar of Wakefield.*

May: Epoch of Reform. Selections from Shelley.

June: Anglo-Saxon Expansion. Tennyson's *Princess.*

Fourth Year, American History, Economics, Civics

First Quarter: American History.

October: Period of Discovery and Colonial History. Lowell's *Columbus* and *A Glance behind the Curtain.* Shakespeare's *Hamlet.*

November: Colonial History. Whittier's *Snow Bound.* Shakespeare's *Hamlet.* Cooper's *Last of the Mohicans.*

December: The Revolution. Burke's *Conciliation with America.* Shakespeare's *Hamlet.*

Second Quarter: American History.

January: Critical Period. Emerson's *Essays.*

February: Westward Movement. Ruskin's *Of King's Treasuries.*

March: Slavery Question. Selections from Lowell's Poems.

Third Quarter: American History.

April: Industrial Development. Tennyson's *Locksley Hall.* George Eliot's *Silas Marner.*

May: Industrial Development. Selections from Robert Browning's Poems.

June: Industrial Development. Matthew Arnold's *Sohrab and Rustum, Self-Dependence and Progress.*

Professional School

First Year

It is intended to make this work a practical study of the subject-matter and methods of the elementary school. It will be necessary to consider first the fundamental principles underlying the teaching of history, and then the outline of the course. After this has been done, the students will investigate the subjects useful for lessons with the little children. This will necessitate a study of Primitive Culture. The students will also begin the related handwork of the industrial arts, especially pottery and textiles.

In literature the work will include typical stories of different nations and periods of history, principles of presentation of these stories to children, relation of literature to history and art, observation of model lessons, and writing of stories.

Second Year

In this year we shall follow the chronological order of history rather than the order of the subjects as taught in the grades. The aim of the work will be to consider methods of historic study, and to give a fuller knowledge of the subject-matter. Having learned in the first year what they need in order to teach history, the students will study with especial purpose. They will be expected to plan work for teaching more independently than before and to give more lessons. The course in the High School may also be considered by those who desire to prepare to teach in secondary schools. The literature for this year will be correlated with history as in the High School, and especial attention will be given to oral reading and dramatic representation.

Applied Algebra

George W. Myers

ACADEMIC DEPARTMENT: The work for November will consist mainly of the geometrical representation of equations. The equations studied last month were brief expressions of simple laws of physics and mechanics. One ($v=gt$) is a statement of the law which connects the velocity (v) of a falling body with the time (t) during which the body has fallen. Another ($f=mx$) is the law which connects the

force with the mass and acceleration of a body which moves under the action of a varying force. In the first case v and t and in the second, f and x are changing continuously, while $g(=32.16\text{ft.})$ and $m(=\text{mass moved})$ remain fixed. And so it is with every algebraic equation. In the equation $y=x$, if $x=1$, y must equal 1; if $x=2$, $y=2$; if $x=2\frac{1}{2}$, $y=2\frac{1}{2}$; if $x=10$, $y=10$; if $x=a$, $y=a$, and so on indefinitely. Any value between those used here might be put equal to x, whereupon y would be equal to the same value. Hence, we see that there are an indefinitely great number of pairs of values for x and y. The equation merely says that whatever value x may have, y must have the same value.

Again, in the equation $y=3x+4$ we have merely an abbreviated statement of the law that whatever x may be equal to, y must equal 4 units more than its triple. It is clear, then, that the numbers of arithmetic (in the last equation the 3 and 4) differ from the numbers of algebra (the x and y) in that the arithmetical numbers have a fixed value, while the algebraic numbers have variable values. Numbers like the x and y, or the v and t, or the f and x, which in a given equation may vary, are called *Variables*. Numbers which always have the same values are called constants.

Principle—An algebraic equation is a brief statement of the law in accordance with which two or more variables are supposed to change.

NOTE.—It may be that in a given case only one pair, or a limited number of pairs, of the values of x and y are wanted. But we are seeking to make clear what the equation means and all it means. This can be done only by making it very plain that both x and y may have an indefinitely great number of values in one and the same equation.

To make the true meaning of the equation very clear will be the purpose of this month's work.

Axiom 1—If the same quantity, or equal quantities, be added to, or substracted from, equal quantities, the results will be equal.

Illustration—If $x=y$, then $x+a=y+a$; or if $x=y$ and $a=c$, then $x+a=y+b$.

Axiom 2—If equal quantities be multiplied, or divided, by the same quantity, or by equal quantities, the results will be equal.

Illustration—If $x=y$ and $a=b$, then $ax=by$; or if $ax=by$ and $a=b$, then $x=y$.

An algebraic expression is any symbol, or symbols, of quantity, or any number of such symbols connected or affected by symbols of operation. An algebraic expression, of course, represents a number.

Symbols of operation are the signs of addition $(+)$, subtraction $(-)$, multiplication $(\times)$ or the period $(\cdot)$, division $(\div, /$ or $—)$, involution (the exponent), and of evolution (the radical sign, $\sqrt{\ }$).

The parts of an algebraic expression connected by the plus and minus signs are called the terms. Terms are similar when they contain the same literal factors. Otherwise, they are dissimilar.

Any two number-symbols, which represent the same or equal numbers, when written one to the left and the other to the right of the symbol of equality $(=)$, form an equation. The two number-symbols are called the members or sides of the equation, and they are distinguished as the right member (or side) and the left member (or side).

An equation is said to be satisfied, or verified, when by replacing one or more of its literal quantities by arithmetical numbers the two sides become identical, or the equation is reduced to an identity.

To solve an equation for any particular quantity may mean either of two things, viz.:

1. To find the arithmetical number

which substituted for the quantity in question will satisfy the equation; or,

2. To express the quantity in question in terms of the other quantities in the equation.

Problems

Plot the graphs of the equations below on cross-ruled paper. Use the side of one or more of the squares as the unit for plotting.

A graduated scale, a right line pen, a fine steel writing pen, some black, red, and blue or green India ink, and an irregular curve will be needed.

Direction: Use heavy black lines for the axes, blue or green lines for the graphs and dotted red lines for the x- and y-distances of plotted points, which latter should be inclosed in small red circles.

REMARK.—In plotting graphs it is usually, though not always, advantageous first to solve the equation for y, then to assume any desired values for x and compute the corresponding values of y.

Equations of Type I: Form $F=\mu R$ (law of friction), or $v=gt$, or $v=gt+v_0$ (law of falling bodies); Type form is $y=mx+b$; (a) $y=2x$; (b) $y=5x$; (c) $y=-4x$; (d) $2y=3x$; (e) $-2y=3x$; (f) $2y-3x+4x-y=0$; (g) $2x+y-3=5$; (h) $\frac{x+y}{3}+2x-3y+1=3$; (i) $y/x=5$; (j) $x/y=-2$; (k) $\frac{6x-3y}{2}-\frac{4x-5y}{3}=\frac{5}{6}$.

Equations of Type II: (A) $v^2=2gh$ (flow of water from orifices) and $t^2=\frac{2}{9}.S$ (falling bodies). Define and teach exponent, square root and radical sign. (a) $y^2=x$; (b) $3y^2=12x+3$; (c) $y^2=x+3$; (d) $\frac{y^2}{2}+x-2=1$; (e) $y^2=-7x$. Type form is $y^2=ax+b$.

Equations of Type II: (B) $f=(\frac{1}{2r})\,v^2$ (centrifugal force) $S=\frac{1}{2}\,ft^2$ (accelerating forces) or $S=g_0t^2-S_0$ (falling bodies); (a) $y=x^2$; (b) $y=3x^2-2$; (c) $y=2x^2+5$; (d) $2y=6x^2-4$; (e) $y=6x^2+3x+4$.

Type form is $y=ax^2+bx+c$.

Other practical equations of this type are the following:

$P = 100C^2$ is the formula for the safe working load of manila ropes (hemp ropes and tarred hemp ropes).

$P = 600C^2$ is for iron wire rope of 7 strands (19 wires to the strand).

$P = 1000C^2$ is for steel wire rope of 7 strands (19 wires to the strand).

$P = 12000d^2$ is for open link chains, and

$P = 18000d^2$ is for stud link chains where P is the safe working load in pounds, C the circumference of the rope in inches, and d is the diameter of the link in inches.

Plot these equations and read off from your diagrams the dimensions of ropes and chains needed to bear various given loads.

Equations of Type III: Form $X^2+Y^2=R^2$. (Relation of a force to its rectangular components. Fundamental equation of mechanics.) (a) $x^2+y^2=4$; (b) $3x^2+3y^2=27$; (c) $x^2/2+y^2/2=2$; (d) $3x^2-2y^2+4x^2+9y^2=28$.

Equations of Type IV: Form $Ax^2+By^2=C$. (Planetary orbits; Law of Kepler.) (a) $x^2+9y^2=9$; (b) $4x^2+16y^2=64$; (c) $4x^2+25y^2=100$; (d) $x^2+12y^2=12$.

Equations of Type V: $Ax^2-By^2=C$. (Cometary orbits; Law of expansion of gases.) (a) $x^2-y^2=4$; (b) $3x^2-4y^2=12$; (c) $-4x^2+50y^2=200$; (d) $5x^2-3y^2=15$; (e) $xy=12$.

Simultaneous equations are such as are satisfied by the same pair, or pairs, of values of the variables.

Plot on the same axes the following pairs of equations, draw in full red lines the x- and y-distances of the crossing points of the graphs and scale off their lengths.

(a) $\begin{cases} y-x=2; \\ x^2+y^2=25; \end{cases}$ (b) $\begin{cases} x+y=4; \\ x^2+y^2=25; \end{cases}$

(c) $\begin{cases} y^2=x; \\ 5y-3x=-2; \end{cases}$ (d) $\begin{cases} 16x^2+4y^2=64; \\ x^2+y^2=9; \end{cases}$

(e) $\begin{cases} 4x^2+16y^2=64; \\ x^2+y^2=9; \end{cases}$ (f) $\begin{cases} y^2=x; \\ x^2+y^2=20; \end{cases}$

(g) $\begin{cases} 4x^2-16y^2=64; \\ x^2+y^2=25; \end{cases}$ (h) $\begin{cases} 9x^2-16y^2=144; \\ 9x^2+25y^2=225; \end{cases}$

What kind of graphs were found to represent equations of Type I? of Type II (A)? of Type II (B)? of Type III? of Type IV? of Type V?

The absolute term of an equation is the term which does not contain a variable. (How does an alteration of the absolute term of an equation affect the graph? An alteration of the coefficients of the variables? Of the exponents?)

It will now appear that a line represents an equation when the x- and y- distances of every point in the line satisfy the equation and when no other points do have distances which satisfy it. For this reason a graph is sometimes termed the *Locus* of the equation.

Here develop the algebraic methods of solving simultaneous simple equations and compare

results with those furnished by the foregoing geometrical methods. As a preliminary means to this, the use of the parenthesis, the fundamental operations, factoring and fractions must be learned.

Pedagogic School

SEVENTH AND EIGHTH GRADE MATHEMATICS—STUDY OF FORCE.—CONTINUED. A fuller development of the method of studying force than could be given last month will be worked out here.

A force is completely known when we know (a) its magnitude or intensity, (b) its direction or sense, and (c) its point of application.

Statics is the Theory of Equilibrium. When three forces, acting upon a free point, just balance, or produce no movement of the point, they are said to be in equilibrium. The point is said to be at rest.

When three such forces are in equilibrium their magnitude and direction may be represented by the three sides of a triangle (triangle of forces). The triangle is, therefore, fundamental to Statics.

But since any one of these three forces just balances the joint effect of the other two, if one of the forces were removed the point would move under the joint action of the other two precisely as though it were acted upon by a single force equal in intensity and opposite in direction to the force removed. Hence, the Theory of Motion (Dynamics) is also based upon the triangle.

If any number of forces act upon the same point at the same instant (concurring forces), their combined effect (their resultant), may be found by the successive use of the principle of the parallelogram of forces as shown in the cut. The successive segments of the broken line $OP_2R_2R_3R_3R_4$, etc., represent in magnitude and direction the forces whose combined effect will produce equilibrium (Polygon of forces).

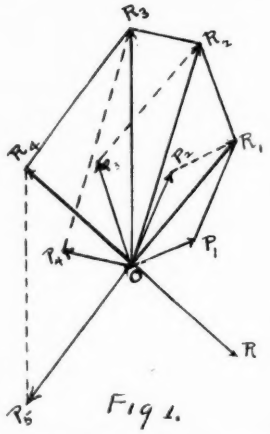


Fig 1.

Study here rectilinear figures concretely, speaking of the sides and angles of the figures as the magnitudes and directions of forces.

A more general method of studying forces is that suggested by this figure:

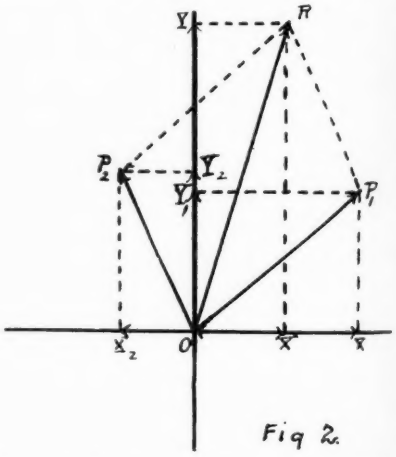


Fig 2.

It is at the same time simpler than the former, as it makes the right triangle fundamental. Explain the method and make a concrete study of the right triangle.

The parallelogram is inserted in the figure to show the agreement of this and the former method.

The third figure shows that this method

applies to any number of forces. Explain how. Define Resolution of forces, Composition of forces, and Transmissibility of forces.

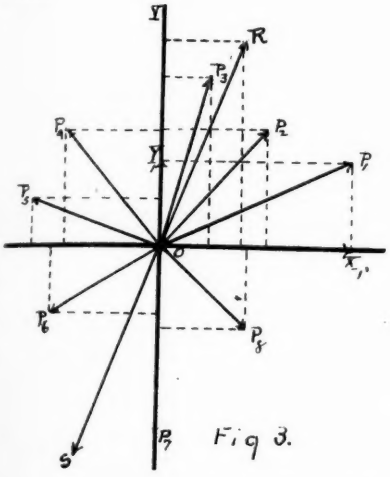


Fig 3.

In connection with the last figure define Conspiring forces, and explain and discuss the algebra of compounding them.

With the aid of the fourth cut show the difference between the problem of treating forces acting upon a point and forces acting upon a body.

Obviously the two forces acting at the points where these letters stand tend not

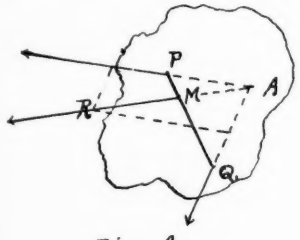


Fig. 4

only to move the body forward, but they tend to turn it, to rotate it as well. The single force, the resultant, acting at *M* does not in this case produce the same effect as do *P* and *Q* acting jointly. Under the action of *P* and *Q* the motion of the body would be composite, consisting of a translation such as *R* would produce, and at the same time of a turning motion.

When two oppositely equal parallel forces act as shown in this figure the resulting motion is only a rotation. Such a pair of forces (*v FF*, Fig. 5) is called a *couple*. The tendency of a force to turn a body

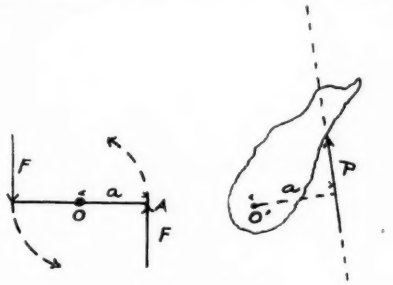


Fig. 5

about a point is called the *Moment* of the force with respect to the point, and it is measured by the product of the force by the perpendicular distance from the point to the line of action (the line along which the force acts) of the force (*a P* of Fig. 5). This Moment is taken as positive when the tendency is to turn the body upward and to the left, and negative in the opposite case. The Moment of the couple is either force (*F*) multiplied by the shortest distance between the lines of action of the two forces (*2 a*).

Here bring out the algebra and geometry of moments. The moment is represented geometrically by a line drawn perpendicular to the plane of the turning through the point (*o* or *o'*), about which the turning is considered, and containing as many units of length as there are units in the moment.

The problem of finding the center of gravity of geometrical forms is interesting and important. The significance of the center of gravity can be best understood by

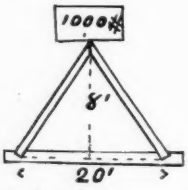
making a preliminary experimental study of a system of parallel forces acting upon a body, by the aid of an apparatus such as is shown in the cut for parallel forces given last month. By its help the resultant may be directly measured, the tendency to turn demonstrated, and the point of application of the resultant found.

It will be readily comprehended that the weight of a heavy body results from such a system of parallel forces, being merely the attraction of the earth for each particle of the body toward the earth's center of gravity, which is so far away that we may regard the elementary forces as parallel. To find the center of gravity is merely to find the balancing point of this set of forces.

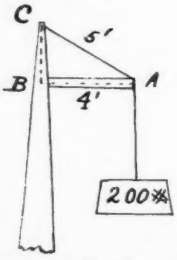
Here take up the geometry of finding the center of gravity of various geometrical figures.

The tendency of a tree or tall structure to fall under the force of the wind will furnish a practical application. What resists or overcomes this tendency (fiber stress)? Numerous applications will suggest themselves.

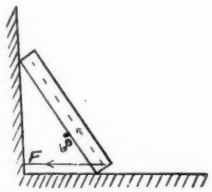
Exercises.



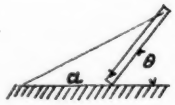
1. Find stress in rafters.



2. Find stress on $A\,B$ and on $A\,C$.

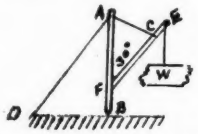


3. The beam weighs 150 pounds. It leans against a smooth wall, and is prevented from sliding by the string or by the force of friction, F. Find F, or the tension in the string.



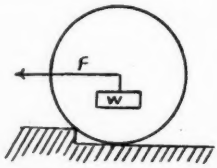
4. Weight of beam $= W$; length, l. String or guy, attached at distance b from bottom end, and at distance a to the left of the lower end. Find tension in string. Use particular values first.

5. Weight of beam = 100 pounds. Find the tension in the strings, also the angles the strings make with the vertical.



6. Boom, $F\,E = 30'$; $A\,B = 40'$; $C\,E = 7'$; $B\,F = 5'$ and $W = 1000$ pounds. Find stress in $A\,D$, also in $A\,C$.

7. Fourteen cubic feet of masonry weigh one ton. Find the force at the middle point that will overturn the wall.



8. Radius of wheel $= r$. Find F required to pull it over an obstruction of height h. Use particular values first.

Home Economics

Alice Peloubet Norton

The work in home economics for the pedagogic school began with a full and free discussion of the meaning and scope of the subject. The fact was emphasized that the home is inclusive of the family as well as the house, and that the management of the home means far more than housekeeping. The following outline was presented as suggesting the various subjects which are legitimately a part of the science of home life:

I. The Home.

1. Historical development.
2. Relation to other social institutions.
3. Function in society.
   - (a) Propagation.
   - (b) Location and defense.
   - (c) Production and transmission of wealth.
   - (d) Intellectual and social training.
   - (e) Ethical and religious training.

II. Formation of the home.

1. The Family.
2. The House.
   - (a) Location and surroundings.
   - (b) Domestic architecture.
     1. Plan.
     2. Foundations and cellar.
     3. Plumbing and drainage appliances.
     4. Heating and ventilating apparatus.
     5. Lighting.
   - (c) Domestic art.
     1. Floors and walls.
     2. Furniture.

III. Maintenance of the Home.

1. Care of house for cleanliness.
   - (a) Care of plumbing.
   - (b) Heating, ventilating, and lighting.
   - (c) Removal of dust and dirt.
2. Food.
   - (a) Selection.
     Food materials.
     Dietaries.
   - (b) Preparation.
     Cooking and serving.
   - (c) Dangers.
     1. Adulterations.
     2. Meat and fruit supply.
     3. Milk supply.
     4. Water supply.
3. Clothing.
4. Home nursing.

IV. Administration of the Home.

1. Relation of different members of the family.
2. Training of children.
3. Domestic service.
4. Financial management.

In a consideraton of the various names proposed for this work, such as domestic science, domestic economy, home science, household economics, household arts, objections were raised to each one, and "home economics" was suggested as on the whole the broadest and best for the general subject.

A discussion followed of the place which this work should hold in the school curriculum, particularly in the grade school, and the purpose with which it should be taught. Its intimate connection with the lives of all makes it especially valuable in training for good citizenship. Cooking or housekeeping, as a trade, or a subject set apart by itself, without relation to other work, has no legitimate place in an ideal educational scheme; but the life of the home, including the household industries, may be so related to all other work, so interwoven with all the interests of the child, as to become an essential

part of his training. The extent to which this may be done is indicated in some measure in the various grade outlines. French, art, number work, nature study, have been brought into close connection with the home industries. An interesting plan is that of making the luncheon period a means of training the children in some of the simplest principles of the care of the home. The pupils of the lower grades set the table for their luncheon, clear it, and wash and wipe their dishes, doing their work by committees, and taking great delight in it.

The need of work which shall elevate the ideals of home life was clearly brought out by a comparisou between the homes of to-day and those of the past. It is unfair to compare, as is often done, the worst or even the mediocre homes of to-day with the best of the past, but no one can deny that there are serious dangers threatening the home, and that these can only be avoided when the community is educated to the highest ideals of home life, and to a sense of its paramount importance. In this education the teacher must take a prominent part, and a clear idea of the function of the home and its place in society is therefore essential.

Any complete study of the subject involves a knowledge of sociology and of the structure of society, and at least a superficial understanding of them is necessary. The following outline given by Professors Small and Vincent will aid in the right conception of the work of the home:

Classification of Social Functions

(a) Propagation. (b) Location or Settlement, (c) Defense against Nature. Animate and Inanimate. (d) Production of Wealth.	The Sustaining System.
(e) Transportation (and Exchange). (f) Apportionment of Wealth (g) Transmission of Wealth.	The Transporting System.
(h) Discovery, Invention, Technical Applications. (i) Communication of Psychical Impulses. (j) Intellectual Training (Transmission of Knowledge). (k) Discipline (Ethical and Social Training). (l) Control (Co-ordination of Activities).	The Regulating System.

A study of the "distribution of these functions among social agencies" shows the family to be more or less actively concerned in nearly all the work of society. Good homes are essential to the well-being of the nation. Good citizenship implies good home-making. The teacher of any branch of home economics must be imbued with this ideal if she would do the work that is best worth while.

As stated in the October number, the subject chosen for study and laboratory work for the first part of the year will be food, including its source, composition, and nutritive value, as well as its preparation. After the isolation of the different food principles, the classification of foods and the study of water as previously outlined, the following topics will be considered:

IV. Mineral Matter.

Kinds, where found, food value, and use in body. Solubility in water, and inference as to cookery of vegetables containing mineral salts. Comparative solvent power of hard and soft water. Quantitative determination of mineral matter in milk.

V. Starch.

Composition, source, value as food, test. Microscopic examination of starch grains from various sources. Effect of heat. Popped corn. Effect of different degrees of heat conveyed by means of water. Comparative study with microscope of mixtures of starch and cold water, starch and water heated to 60° C., starch and boiling water. Cookery of cereals.

VI. Change of starch into sugar. Classification of carbohydrates.

References

Small and Vincent, *An Introduction to the Study of Society*, pp. 237-250, American Book Co.; Annual Reports of Divorce Reform League, 1890-98; Church's *Food*, Chapman and Hall; Matthieu Williams, *Chemistry of Cookery*, Chap. XI, Appleton & Co.; American Kitchen Magazine, Vol. IV, p. 218; Vol. V, p. 228; Vol. VI, p. 179; E. H. Richards, *Food Materials and their Adulteration*.

For the work in the grades see Miss Cooke's outlines. In the upper grades the work for this year will follow closely that laid down for the lower grades, since the present classes have had no work of the kind. It will of course be carefully adapted to the ability of the children.

The Home-Maker's Course

In addition to the pedagogic and academic courses the school offers an opportunity for those who are not preparing to teach to take special courses in home economics.

Home-making is to-day the only profession for which the most superficial training is generally considered more than sufficient; yet home-making in its highest and best sense is more than a trade, or group of trades; it is entitled to rank with pedagogy and law and medicine. It is a profession worthy of the best talent and the most complete training. A two years' course, embracing a variety of subjects under different teachers, specialists in their own departments, will constitute a professional school for home-makers. The requirements for admission will be practically the same as for entrance to the school of pedagogy, the equivalent of a high school course.

The course will include work in the natural sciences which find especial application in branches of home economics, chemistry, physics, biology, bacteriology, physiology, hygiene, and the botany of food plants. The work in these will be applied in the study of the sanitation of the house, including its situation, its drainage, ventilation, and heating, and the general care for cleanliness; in the study of food, its composition, cost, and nutritive value, its selection and preparation, and the calculation of dietaries; and in the study of the physical well-being of the family, including home nursing.

Art will form an important part of the work, and will be applied to house architecture, and to the decoration and furnishing of the house, as well as to textile fabrics and clothing. Economics and mathematics will both be used in the study of the financial management of the home, the question of the division of the income, and the keeping of accounts. The domestic service problem will be studied from the standpoint of economics.

The care and training of young children is one of the most important duties of the home-maker, and involves some knowledge of psychology and of educational methods, as well as of literature.

Power to handle material, control over things, is essential for the best management of the house, and this will be given by work in sloyd as well as in the household arts of sewing and cooking.

The best training of the individual will be kept in mind throughout all the course.

For those who cannot take so complete a course as that outlined, there will be special classes meeting twice a week for work in sanitation, in house decoration, and in food, including cookery.

A full outline of the work in all courses will be given in the December COURSE OF STUDY, with the names of instructors.

Cooking in the Primary Grades

Flora J. Cooke

In the outline for the grades it will be seen that during the past month the chil-

dren have visited a farm and studied the storing of crops and the various ways of preserving fruits and grains for use in the winter.

In the dramatization of the story of the first Thanksgiving, the primary children will try the primitive Indian ways of grinding, cooking, and preserving corn.

The cooking for the lunch in the primary grades, as described in last month's COURSE OF STUDY, will be confined to three cereals—corn, rice, and wheat. With the help of museum specimens, pictures, and selected and prepared reading lessons the children will discuss the manner of growth and harvesting of these grains and the processes by which they are prepared for use as food. The extent of this work in each grade will depend upon the previous experience and present interest of the children.

Simple experiments for discovering the gluten, starch, water, and ash in the cereals will be performed by the children when their questions demand such analysis as explanation for their results. All observations will be carefully recorded to be used as data and guides in future experiments. Some of the observations recorded will probably be:

A record of time taken to parch and pop corn under different conditions.

Results of a comparison of parched wheat, corn, and rice.

Results of cooking each grain in cold water. Results of boiling each a given length of time.

Notes on the making of cereal coffees.

A record of physical changes produced by each process of cooking.

The effect of baking, boiling, and roasting upon the taste of each grain.

The esthetic side of the work will be emphasized in the preparation and serving of the food to invited guests.

Language, reading, writing, and number lessons are obviously incidental, but most essential to accurate execution in this work. See Reading Lessons in December number of COURSE OF SUTDY.

In number the problems will consist in measuring quantities and estimating the cost of materials; in determining the exact amount of water each cereal absorbs under various conditions; in measuring the temperature and time required in different experiments; in the planning and making of the recipe book; and in the keeping of marketing accounts for the month.

For detailed plans for making of aprons, dish-towels, and cook books, see Department of Industrial Arts for December.

Art

John Duncan

HIGH SCHOOL AND PEDAGOGIC SCHOOL. The work for this month will be a continuation of that indicated for October. (See October Outline.)

Much that is suggested in the outline may give place to other work more pressing, such as the decoration of the building we are to occupy during this winter, and any temporary decorations called for by special occasions. This month we celebrate Thanksgiving and will begin to plan the decorations for Christmas. The students will form themselves into little voluntary groups for the doing of special things, and work into each other's hands, the less skilled assisting the more skilled in their work, somewhat on the lines of the apprentice system of the Renaissance, each to help in the degree of his or her ability, from the greatest to the least.

All the energies of the Art Department will be directed to the doing of work needed by the community. The work may be classified as below:

1. As indicated, the decoration of this and other schools with illustrative pictures, statuettes, and panels modeled in relief and colored. There is a great want of effective and appropriate pictures for the use of schools, and it is thought that as the teachers and pupils know their own most intimate needs, such pictures might best originate with themselves.

Suggested subjects — for use in the kindergarten and first grades. *a*. The rooms of a house; kitchen, dining-room, drawing-room, library, nursery, bedroom, bathroom. *b*. Animals: Cats, kittens, dogs, hens, chickens, etc. (the more familiar animals), and perhaps a few of the most impressive of the strange ones. *c*. Illustration of fairy tales.

The story of Ulysses told in five pictures for the use of the Fourth Grade: these to be done in silhouette much in the manner of the Greek vase paintings.

2. Increasing the collection of materials in the school.

3. Making of pictures, models, and art objects of every kind to be handed over to the students of the Pedagogic School on their leaving us, as a nucleus for their own future collections. This, which has already been done in an intermittent way, is to be regulated and become part of the ordinary business of the school.

4. Making of presents for parents and others.

NOTE.—The students will carry sketch-books with them through the various departments of school, to the museum, in the park, and streets: (1) to make memoranda of subjects for their art as they are suggested in the different classes; (2) to seize their inspirations as they come, and (3) to capture the life in motion about them.

Speech, Oral Reading, and Dramatic Art

Martha Fleming

The work begun in October will be continued along the lines indicated, and every effort made to increase the power of clear, easy, forceful speech, and to make the children feel at home while speaking to their class or to the whole school.

In the primary grades it is suggested that if the children tell again the stories told to them last month it will help to bring about this result. Children love to hear the same story over and over again, and they will listen attentively and sympathetically to each other.

The responsibility thus thrown upon them will give practice in the use of language and add to their vocabulary, for they unconsciously use the words which were used by the author or teacher. Work of any kind done by an individual or by a group may be explained or reported in the same way. We have now the natural conditions for free expression: the school has resolved itself into speaker and audience, an ideal arrangement for cultivating power in speech. The effort of the speaker to interest and hold his audience will develop skill in the use of his voice and body and tend to increase his personal power. When a story admits of dramatization, and the interest demands this mode of expression as the one which, through the personality of the actors, will make most real, most alive, the loved heroes of story, history, myth, and romance, opportunity will be given for the full realizations of these ideals.

A dramatization should come at the end of the month as a summing up of all the experiences on a given subject. Dramatic art appeals to the eye and to the ear. It is a succession of related pictures which unifies all that may have been expressed in part by other modes of expression.

The children's natural love for rhythm, and for beauty and harmony of sound, calls emphatically for the poetic form of literature. Mere prose facts deaden and depress both body and spirit; the dance, music, art, and poetry bring into the highest action body, brain, and heart, and stimulate the whole being; therefore they should be put into the real life of the children, and made a living part of every day's work. For this reason a beautiful poem, related either to the subjects of study or to some other interest in the life of the children, has been selected for this month. Others will be added as the work and interest of the children may suggest.

Thanksgiving and the preparation for it will occupy much of the children's thought in November. The harvest feast is an old institution, and its origin and the manner of its celebration at different periods and among different peoples is a fruitful subject of study and an appropriate one for dramatic treatment. On Thanksgiving Day the result of this study will be presented by groups in historic costume, accompanied by music and poetry.

The whole school, academic and pedagogic, will take part in the Thanksgiving celebration.

In connection with the French Department and the Cooking Department, a little Thanksgiving dinner, which will combine French Dramatic Art and cooking, will be given. A French menu will be served. The waiters will speak only French. The company will be entertained by French songs, stories, and fables. A little play also will be given, for the purpose of cultivating courtesy and graciousness of manner.

The work in this department will reinforce the work done in Physical Training by constantly demanding deep, full breathing in voice production, and correct positions in sitting, whether studying, writing, drawing, or painting, also by insisting that each student shall carry the body erect and well poised when standing or moving about. Physical training loses its function if the energy used in exercise does not result in correct habits in these fundamental actions. Constantly repeated action soon sinks into the automatic, and trivial causes will often induce serious and destructive habits.

The highest form of physical culture is the natural response of the body to thought. By muscular action it is constantly revealing predominating thoughts and emotions. Every bearing, attitude, and inflection, every bit of muscular relaxation and contraction, is the expression of some thought or condition of the being. The habit of inhibiting this expression, to which much school life tends, only turns the roused energy into another channel, and the body truthfully records this inhibition.

The work in the Pedagogic class will much of it be directed towards breaking this habit. If fear of ourselves or of others is in possession of our souls it is also in possession of our bodies, and controls every muscular action and every tone of the voice. Often new environment acts to produce fear, or it may come from lack of practice in self-expression. We shall, therefore, begin at once to read aloud to the class, to tell stories related to subjects of study, and to commit to memory and recite some of the literature used in the grades.

The only way to overcome self-con-

sciousness is to think so clearly and feel so deeply that there is no room for fear or other thought of self, and expression becomes a necessity and a delight.

For the special work in each grade, see the grade outlines.

Suggestions to Teachers

The outlines for the different grades this month allow for much supplementary reading.

Reading for study should as a rule be done silently. There is danger of calling for too much oral reading.

Reading is thinking by means of the written or printed page. Oral reading is the expression of thought and emotion.

In so-called sight-reading for children the words should be those readily recognized and functioned. The sentences should be short and the thought and emotion within such easy grasp that the reader can give his energies to expression.

Do not put a book into the hands of children and ask them to read orally at sight a bit of history, a scientific observation, or a story that you could not read without study.

Two motives govern the desire to read aloud; first, the desire to share with others what one possesses; second, the necessity for expression as an outlet for aroused energy.

Do not call for oral reading until the children have something to tell. Ideal conditions for oral reading are one book, a reader, an audience, and interesting material.

Do not lose the children's point of view in reading. They read because of their interest in the story, and are impatient of interruptions. "I don't see," said one little girl, "what our teacher meant. We were so interested in that story we could hardly keep our seats, and she kept stopping us and asking us questions, and making us do it over and over again until we just *couldn't* stand it. I don't want to go to that school any more."

Do not allow a child who is reading orally to struggle with the pronunciation of a word. Help him incidentally; keep him unconscious of his difficulty. The book means to many children only a struggle with words, and oral reading word-calling. They image only words, and there is no room for the thoughts and emotions of which words are the signs.

Do not drill upon words or phonics in close connection with oral reading, lest the child's mind be distracted from the thought. The whole energy of both teacher and class should be directed towards one end—the securing of vivid images and adequate expression.

Do not call upon one child to criticise another's reading, or ask him what is wrong with it, or how he would read it; the interest should be so intense that the impulse of every child is to express his own images, not to criticise others. Call for reading from the different children. The class will unconsciously note differences and select the most truthful interpretation of the text.

Cultivate a habit of independent study of the text.

Do not ask the children how they would read this line or that stanza; let them read and judge from their expression what images they have. If they are not appropriate and full, stimulate to better imaging by questions, by pictures, by stories, and then call for expression when the emotion is at its height.

Do not analyze a selection until the life is all taken out of it. Allow only such discussions and analysis as will make the images vivid. View the selection as a whole. Strike for the great central thought; this includes the lesser.

Do not speak to the children of empha-

sis, pause, or inflection. Technique comes through doing.

Have the courage to accept genuine expression, no matter how crude it is.

The record of work is the child himself. How does he think? How does he carry himself? How does he use his body in expression? How does he use his voice? How does he speak? How does this mode of expression react upon him?

The Motherless Turkeys

The white turkey was dead! The white turkey was dead!
How the news through the barnyard went flying!
Of a mother bereft, four little turkeys were left,
And their case for assistance was crying.

E'en the peacock respectfully folded his tail,
As a suitable symbol of sorrow,
And his plainer wife said, "Now the old bird is dead,
Who will tend her poor chicks on the morrow?
And when evening around them comes dreary and chill,
Who above them will watchfully hover?"
"Two each night I will tuck 'neath my wings," said the duck,
"Though eight of my own I must cover!"
"I have so much to do! For the bugs and the worms in the garden,
'tis tiresome pickin';
I have nothing to spare—for my own I must care," said the hen with one chicken.

"How I wish," said the goose, "I could be of some use,
For my heart is with love over-brimming;
The next morning that's fine, they shall go out with my nine
Little yellow-backed goslings, out swimming!"
"I will do what I can," the old dorking put in,
"Though I have ten of my own that are only half grown,
And a great deal of trouble to see to,
But those poor little things, they are all heads and wings,
And their bones through their feathers are stickin'!"
"Very hard it may be, but don't come to me!"
Said the hen with one chicken.

"Half my care, I suppose, nobody knows—
I'm the most overburdened of mothers!
They must learn, little elves, to scratch for themselves,
And not seek to depend upon others."
She went by with a cluck, and the goose and the duck
Exclaimed in surprise, "Well, I never!"

—MARIAN DOUGLASS.

Music

Helen Goodrich Bertha Payne

In the teaching of songs in the first four grades arithmetic is needed to help clear up ideas of time. Addition and fractions will be useful in developing this point. The use of reading in these grades is obvious. The stimulation of an attractive song sung to little children makes the reading of the text a relatively easy task. In all grades there is constant necessity for clear and correct enunciation and articulation, for the purpose of making more vivid one's own ideas, as well as for communicating them to others; right pronunciation is always insisted upon; and an intelligent rendering of the text (oral reading) reacts most favorably upon the declamation in singing.

During October the children in all grades think a great deal about the plant life which has been developing through the summer and has come to fruition, supplying us with many of our most-needed foods; and the harvest songs are followed naturally in November by those of Thanksgiving. Songs of frost, wind, and perhaps snow will find their appropriate places in all the grades.

The reason for the comparatively large number of songs given for each grade — the singing teacher is with the children only twice a week — lies in the importance of variety. The value of a large musical experience cannot be overestimated; it is the condition of growth. There is little reason to expect the development of a subtler sense of rhythm than is inculcated by a Sousa march, or finer melodic discrimination than the popular "coon-song" demands, unless the musical feeling and understanding are continually being broadened by experience in singing intelligently many beautiful songs. It will often be wise to use only one or two verses of a song, or to drop it as soon as it has been sung a few times with vivid expression and proceed with others.

Besides the Thanksgiving, Wind, and Frost songs, a number of songs is given for the First, Second, and Third Grades, from which will be selected those which prove to be the most useful as the month's work develops. Most of the songs selected for these grades are composed of the simplest possible intervals, arranged in very simple rhythm, which still have varied and musical content. Some of them will be found very useful in the matter of close observation of musical elements, supplying material for necessary drill.

Songs

First, Second, and Third Grades: *We Plough the Fields*, p. 24, Eleanor Smith's Songs for Little Children; *Jacky Frost*, p. 80; *The Squirrel*, p. 30; *When the Little Children Sleep*, p. 96; *The Elephant*, p. 52; *The Snow Birds*, p. 35; *The Trees*, p. 10; *Earth's Dresses*, p. 54; *Jumping Johnnie*, p. 46; *Bells That Hang*, etc., p. 34, Primer, Modern Music Series.

The Fourth and Fifth Grades will sing the Thanksgiving songs and hymns together. The Fourth Grade, being interested in Chicago, its labor and laborers of all nationalities, will learn more folk and national songs, and some trade-songs. The blacksmith song gains added interest from its connection with the Siegfried story. The Fifth Grade will learn a spinning song in connection with their reading of Miles Standish. *The Months* will be used partly to develop some work in sight-reading and dictation.

Fourth Grade: *Harvest* (hymn), Songs of Life and Nature, p. 186; *We Plough the Fields*, Eleanor Smith's Songs for Little Children, No. 2, p. 24; *Wind Song*, Modern Music Series, First Book, p. 94; *The Months*, Modern Music Series, Primer, p. 62; *A Snowy Day*, Modern Music Series, Third Book, p. 174; *Sing a Song of Workshops*, p. 20; *The Blacksmith*, p. 90, Modern Music Series, Primer.

Fifth Grade: First five songs given for the Fourth Grade; *Duke Street* (hymn); *Spinning Song*, Modern Music Series, Third Book, p. 114.

The songs for the Sixth, Seventh, and Eighth Grades will be analyzed as to rhythm and intervals of some of their prominent phrases, and some dictations will be given out of the Primer. The soprano of the new hymns for morning exercises will be learned.

Sixth, Seventh, and Eighth Grades: *Harvest* (hymn), Songs of Life and Nature, p. 186; *Snowy Day*, Modern Music Series, Third Book, p. 174; *Nutting Song*, Modern Music Series, Second Book, p. 162; *He Prayeth Best* (two parts), p. 32; *We Merry Minstrels* (three-part Round), p. 15, Modern Music Series, Third Book.

The High School pupils are chiefly interested in helping with the songs and hymns for morning exercises and Thanksgiving songs. Preparation for part-work will be carried further by the study of *Songs* on p. 126, Third Book, Modern Music Series. The boys will be drilled on the bass parts of *America* and the hymns, and the girls will begin special work on the *Christmas Carol*, by Reinecke, Songs of Life and Nature, p. 40. (Also given in July number COURSE OF STUDY.)

Lead, Kindly Light and *Balder, the Beautiful* (Songs of Life and Nature), will be studied carefully by the High and Pedagogic Schools, and will be learned by the grammar grades as fast as practicable for use in morning exercises.

Marches for Gymnasium: *Military March*, Schubert; *Military March*, from *Figaro*, Mozart; *Swedish Wedding March*, Söderman.

For grade-rooms and kindergarten, *Five Marches for Kindergarten*, Eleanor Smith, are recommended.

Singing in the Pedagogic School

Bertha Payne

Since the first essential in teaching singing to children is the presentation of a good model in the teacher, we shall work this month mainly to secure a better control of the voice, rather than to reach any conclusions concerning the pedagogy of the subject.

The voices have been tested, and special exercises have been recommended for individual pupils. This work will be continued as far as possible with frequent personal supervision and suggestions. The use of vocal exercises in a large class is helpful in the main, but may be harmful to those who nullify the intended good effect by wrong singing of a good exercise. Experience shows that a large majority of students and teachers have in common certain hindrances to the production of beautiful tone; to overcome these habits we will give our attention first to forming and keeping in imagination the ideal tone, pure, sweet, and full; second, to persistent practice of a few exercises.

The most common obstructions are tight throat muscles, stiff tongue-root, stiff jaw, and wrong direction of breath. Where these conditions exist a good tone is impossible and enunciation is necessarily thick.

EXERCISES FOR BREATHING: Deep inhalation in puffs. Long, slow exhalation. Quick, deep inhalation. Exhalation in puffs; emitting as little air as possible at each puff. Quick inhalation, with firm diaphragm, and emission in audible recitation or counting.

FOR DIRECTION OF BREATH: Breath sent to the lips by continued use of lip-consonants, with the vowels "o" and "e" as, vo-vo-vo-we-we-we.

FOR JAW AND TONGUE: Simple withdrawal of energy, making organs limp. Singing vowels very lightly under these new conditions.

The difficulty of the problem lies first in the relinquishing of habit; and second, in the selection of new paths of innervation, where the eye cannot guide at all, and the ear but partially.

When this "voyage of discovery" has by accident, as it were, found the true path, the next step to success is to secure the judgment of another as to the purity of the tone, and then to fix the feeling that results from the new use. This process firmly adhered to, with a true conception of the ideal tone, will work a change for the better in every voice.

The songs will be, first, hymns and songs of general interest. Later, children's songs will be studied.

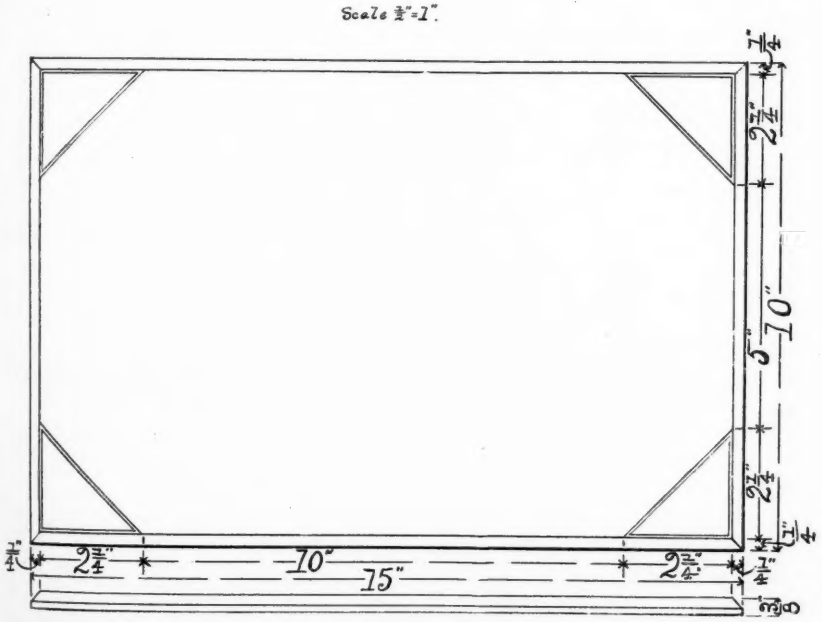
Manual Training

Ira M. Carley Cora Champlin

During the months of November and December the handwork of the school will be principally the making of articles for use in the home, especially things for Christmas gifts.

This work is particularly valuable in the opportunity it affords for the cultivation of the relation between the school work and the home interests, and for awakening the children's interest in the furnishing and decorating of their own homes. The choice of what shall be done will rest as much as possible with the individual pupil rather than with the teacher.

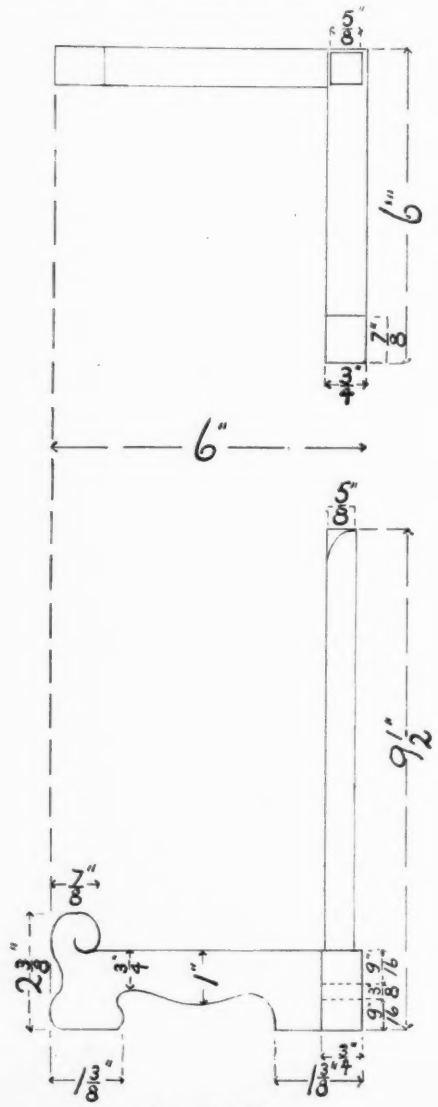
It is believed that whatever may be lost in this manner of procedure, in sequence of exercise, is much more than compensated for by, the increased spontaneity



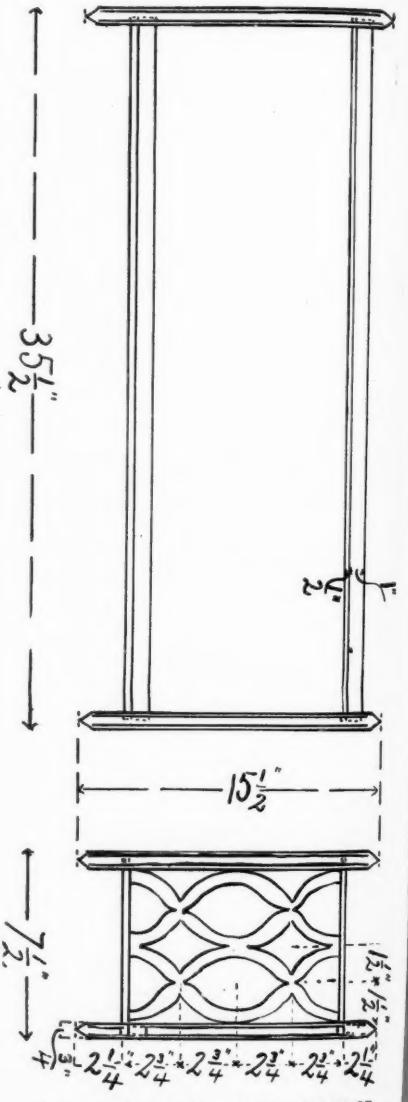
No. 1. BLOTTER PAD.

of interest, the development of the power of individual initiative, and by the fact that the pupil is working under the stimulus of the very best of motives — that of attaining an end which he himself feels to be good and worthy his best effort.

The statement that the choice of work rests with the pupil does not mean that he shall be at liberty to attempt any idea that may appeal to him, as his inexperience usually leads him to underestimate

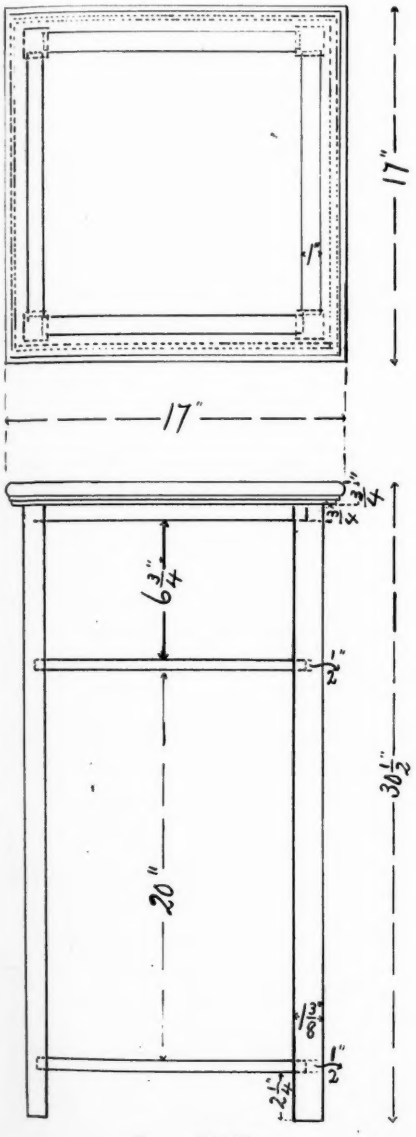


No. 2. EASEL.

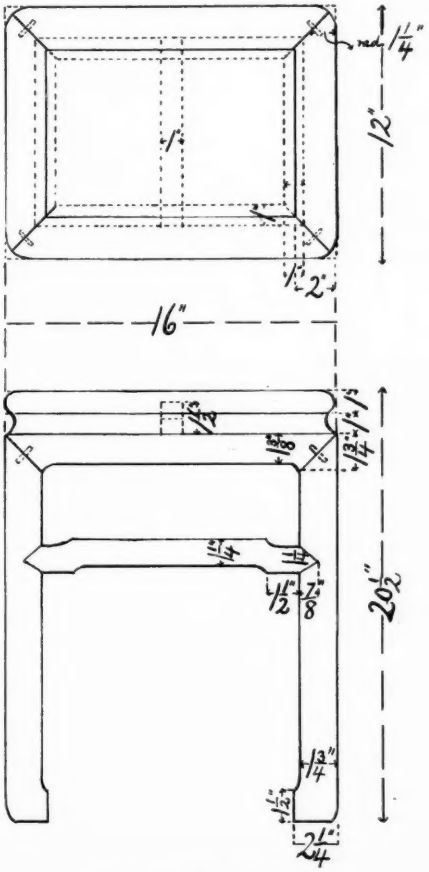


No. 3. PLATE RACK.—FLEMISH OAK OR VERMILION WOOD.

the difficulties to be overcome; and as a result of beginning work beyond his power he becomes discouraged by continued failure. It means that any idea of the child's own will be treated as of the greatest value, and if it is at all practicable he will be encouraged to work it out, and help will be given, when needed, in perfecting it in design and construction, and in adapting it to his skill and experience. Before the children are asked to make a selection of the work they are to do in any branch of handwork, they will be given opportunity of becoming familiar with a number of good examples of work of the given kind adapted in construction to their ability.



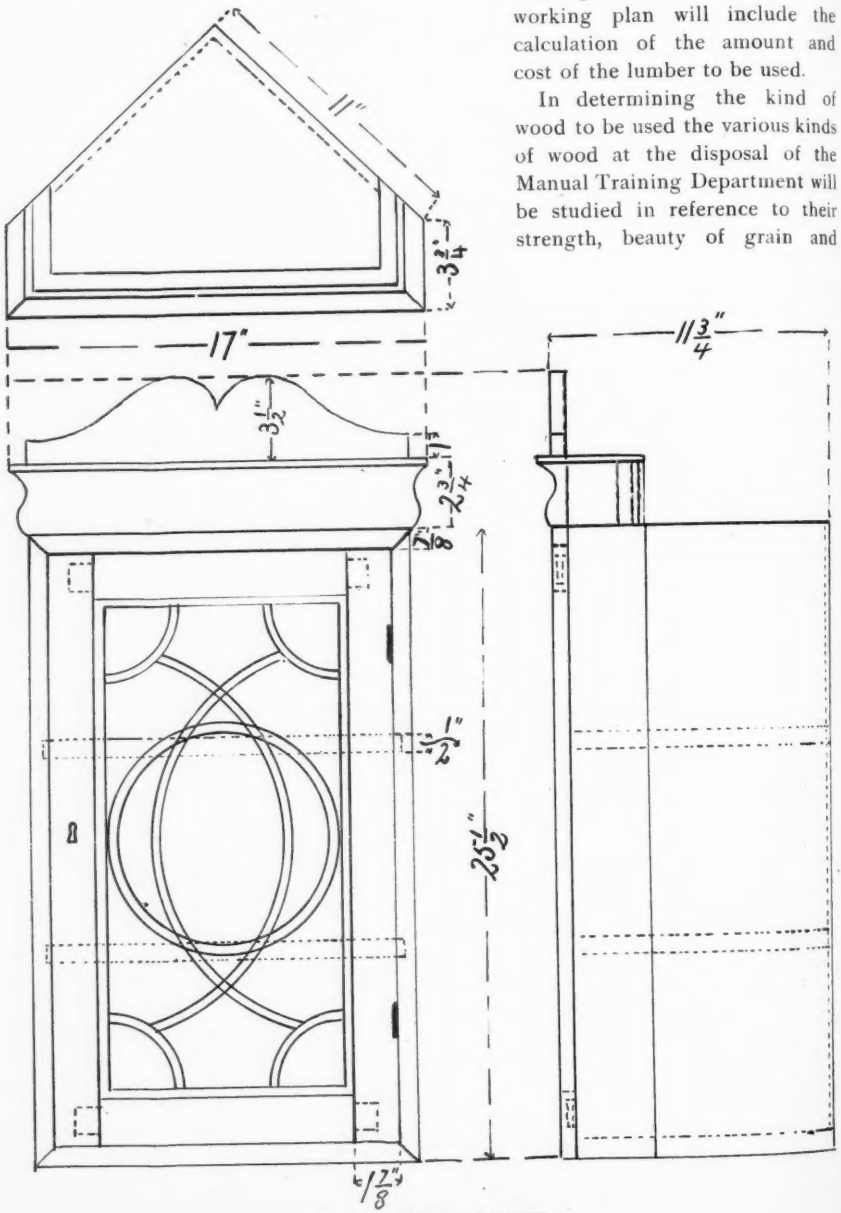
No. 4. TABLE.



No. 5. JARDINIERE STAND.
(Chinese.)

When the pupil has decided upon what he will make he will be asked to make a free-hand sketch of the object, and in the woodworking department a working drawing made to a scale. The working plan will include the calculation of the amount and cost of the lumber to be used.

In determining the kind of wood to be used the various kinds of wood at the disposal of the Manual Training Department will be studied in reference to their strength, beauty of grain and



No. 6. CORNER CABINET.

color, hardness, and degree of difficulty in working.

The accompanying drawings are intended as suggestions for pieces of woodwork for the upper grades and the high school, except No. 1, which is intended for the Second Grade.

Plans for some of the designs finally adopted will appear in the December number of the COURSE OF STUDY.

Physical Training

Karl J. Kroh

General Gymnastics: The cultivation by by the pupils of an erect carriage and good bearing must be insisted upon on all occasions, at all times. Pupils will be required to rise promptly and to stand properly, correctly observing the fundamental standing position, with head erect and chest active. A frank and open look should be characteristic of their address. Pupils persisting in faulty attitudes during recitations will be referred to the teachers' assistants for special gymnastics.

Particular attention will be given in all seasons of the year to the dress adaptation of the pupils to physical exercise, and no clothing, wraps, tight bandages, or inelastic belts, in any way restricting freedom of action and a natural development, should be worn. Rubber shoes or boots should not be worn during school hours.

The physical training must always be conducted in pure air, and short, vigorous exercises given whenever needed. Plenty of light is also advisable. Study the ventilation of the rooms and test the air by outdoor breathing. The temperature should be about 68°.

If practicable, exercise in the open air, outdoors. Avoid unnecessary exposure to draughts. The work should be essentially contributive to the health and spiritual freshness of the children and students, and must be directed as a means of developing personal vigor. Outdoor exercise, therefore, is preferable to room-drills.

Caroline Crawford

In the same way that the children are led to gymnasium practice they must also be introduced to gymnastic play. Experience teaches that even the games of children must be first learned, and that these need preparation and practice, extension and limitation, as does every other pursuit. There are pupils whose disposition is opposed to the normal activities of childhood, in whom an indoor life has destroyed the inclination to play. In others the zeal for play must be tempered. Children needing special attention in physical training are brought to the offices of this department by the teacher's assistants, who will receive instructions for the work of such pupils. Such work is to be directed by the assistant teachers at a time specially designated by the regular teacher, or as advised. Reports concerning state of health, progress, regularity of school and designated home work are to be regularly made every week.

On presentation of children for special work, the regular teacher's detailed statement in each case is desired.

Gymnasium work consists of (a) mass, (b) class, (c) group, and (d) individual practice; and embraces tactics or order exercises; free standing movements and exercises; exercises with hand apparatus; dancing calisthenics, for girls; running exercises; apparatus gymnastics; jumping and vaulting exercises; games and plays. Time devoted to the different forms of

exercises will vary according to selection and values of the respective exercises, choice and content of selection being determined by the degree of skill and proficiency attained by individual classes undergoing physical training.

Mass work employs all pupils of one or more grades in a like order of work; class work employs the pupils of one grade only in work specially designated or adapted; group work is represented in smaller divisions of grades showing marked differences in skill or ability; individual work ordinarily consists of successive execution by pupils of exercises (in groups); also, of repetitions of forms of exercises of a lesson, in which pupils are deficient—under special direction. The different forms enumerated can be utilized for either mass, class, or group work. Their order or place, in a lesson, therefore, may vary; for instance, running as well as tactics may precede, interrupt, or follow free standing exercises; tactics may become an accompanying feature of apparatus work; springing exercises may follow or be practiced as a part of apparatus work; fancy steps may be substituted for free exercises with girls; indeed, a selection — with reference to form — may depend on most or all the characteristic forms of work for its complete representation. This difference in lesson-programs, however, is had only in grades in which pupils have become familiar with an abundance of material, as in the upper grades.

To facilitate progress in gymnastics emphasis is placed upon the fundamental procedures represented in the various adaptations of free standing movements and exercises throughout the first term. The order of exercises in this practice is as follows:

TACTICS: Positions; preparatory practice of movements occurring in formations and alignments, as stepping, marching, halting, and turning exercises. Emphasis of good posture, bearing, and carriage, fundamental to the execution of all gymnastic practice.

ACTIVE CHEST WORK: Backward and sideward flexions of the head; backward trunk flexions; respiratory exercises with accompanying arm movements. Accentuation of proper lines of chest and back development; poise.

ARM AND LEG EXERCISES: Extensions and elevations, etc.; striding and lunging exercises; heel-elevations and knee-bending exercises combined in alternate and simultaneous execution. Development of co-ordinative power.

TRUNK EXERCISES: Forms of flexions, backward, forward, and sideways; rotations; rotations and flexions combined. Reinforce design of preceding work, strengthening the muscles of the abdominal walls.

ARM AND LEG EXERCISES: As above, or combined with tactic exercises. Moderate effects of preceding exercises.

The above order of exercises is chosen for all practice periods directed by teachers or students. Omissions lessen the value of the practice.

In outdoor or hall practice moderate running exercises may find a place under arm and leg exercises, preceding trunk exercises; springing exercises may follow trunk exercises. Respiratory exercises are introduced whenever needed.

Games and plays are practiced only during specially designated play hours, and must not be substituted for practice in free standing movements.

Pedagogic Class: Study of the preliminary plan of work-adaptation suggested in the October issue. Purpose: To meet the physical requirements of the pupils for healthy development, through selection of appropriate material; to enhance study-power, and skill through progressively co-ordinated action. Physical development and health of pupils as judged by actions and attitudes. Estimates of condition, of strength, control, and skill obtained in the practice of ordinary movement forms, such as walking, running, hopping, jumping, etc., and during observation of games and plays. Indications of strength, mobility, flexibility. Degrees of volition, attention; accuracy in execution; gymnastic development; modes of progress.

Physical measurements and tests; comparison of heights, weights, breadths, girths, etc., with the standard for a given age. Physical character-

istics revealed in comparative studies; length of parts of limbs in relation to body; of over and under developed parts; inherited and acquired tendencies. Defects of faulty muscular habit, in attitude or movement; sense defects.

Periods of growth and development during school life; characteristics of childhood and adolescent periods. Influences of school life; development of tendencies indicated in school habits. Importance of foreseeing and counteracting tendencies toward faulty action and posture.

The discussion of the technical work of the past month will include a consideration of the order of exercises, modes of execution, mechanical details, gymnastic development, and general effects.

Individual Gymnastics: The physical measurements reveal only the data in regard to size, strength, symmetry, and proportion. In addition we must know defects of parts, and the examiner's report is our guide.

Examiner's Report

No.....
Date.....
Ht.....
Cir.....
St.....
Blood.....
L.....
M.—h. s. f. c.
S.—c. m. p. b. r.
P.—b. f. s. p. p.
He.—f. b. r. l.
Sh.—f. d. r. l.
Ch.—d. f. r. l. c. p. h.
S.—d. p. t. b.
Ri.—d. p. r. l. c.
St.—d. p. c.
Ab.—d. p. f.
W.—b. d. f. n.
Lu.—h. f.
Ba.—r. h.
Sp.—p. c. r. l. a. r. c. d. l.
Sc.—p. f. r. l. d.
Ar.—b. t.
Ar.—e. f. p. s.
Hi.—b. n. f. h. r. l.
Th.—e. f.
K.—w. b. k.
Lg.—e. f.
Ru.—r. l.
Fa. Le. Me.

Key to Examiner's Report

Heart.....
Circulation.....
Standing.....
Blood.....
Lungs.....
Muscles—hard, soft, flabby, coarse.
Skin—coarse, muddy, pimply, brown, rough.
Head—forward, back, right, left.
Shoulders—forward, down, right, left.
Chest—depressed, flat, prominent, right, left, center, hollow.
Sternum — depressed, prominent, twisted, bent.
Ribs — depressed, prominent, right, left, center.
Stomach—depressed, prominent, curved.
Abdomen—depressed, prominent, fat.
Waist—broad, deep, flat, narrow.
Lumbar—hollow, full.
Back—round, hollow.
Spine—prominent, curved, right, left, anterior, rotation, cervical, dorsal, lumbar.
Scapulæ—prominent, flat, depressed, right, left.
Arms—biceps, triceps.
Arms—extensors, flexors, pronators, supinators.
Hips—broad, narrow, full, high, right, left.
Thigh—extensors, flexors.
Legs—extensors, flexors.
Knee—weak, bowed, knocked.
Rupture—right, left.
Fat, lean, medium.

From the measurements and examinations, the special prescriptions are made for individual practice and control. The form of prescription, as also the special indications from each part measured, will appear in the December outline.

Greek and Latin

Allen W. Gould

EIGHTH GRADE. The pupils continue their study of Greek life and thought by reading in Greek the appended passages, and discussing, in short Greek sentences, the matter contained in the lessons, and in the works of reference which they will be asked to consult. Each student will look up one or more subjects, and report to the class, so that the whole class will have the benefit of the work of each individual.

NINTH GRADE. The student will continue the study of the Greek character, as contrasted with that of the Barbarians, by reading Xenophon's Anabasis, I, 3, 4.

They will look up *ecclesia*, *choinix*, *obolus*, and *mola* in Harper's Classical Dictionary and Smith's Dictionary of Antiquities; *Tarsus*, *Issus*, and *Babylon* in Harper's Classical Dictionary and Smith's Dictionary of Geography, and *mills*, *mediumus*, and *coinage* in Seyffert's Classical Dictionary, and read Grote's *History of Greece*, ch. 69.

TENTH GRADE. The pupils will continue the study of the life of Socrates by reading Xenophon's *Memorabilia*, I, 4, 5; II, 1 (1-2, 21-34); IV, 2, 5, and 8.

They will consult Harper's and Seyffert's Classical Dictionaries and Smith's Dictionary of Biography and Mythology regarding *Hercules*, *Prodicus*, and *Aristippus*. They will also read Grote's *History of Greece*, ch. 68, and Grant's *Greece in the Age of Pericles*, ch. 12.

ELEVENTH GRADE. Students will continue their study of Greek religion by reading the Odyssey, II, III, 1-200.

They will look up *Athene*, *Poseidon*, and *Nestor* in the encyclopedias and classical dictionaries and in Smith's Dictionary of Biography and Mythology; *agora*, *currus*, and *navis* in the Classical Dictionaries, and *ship* and *chariot* in Seyffert, and will read Gardner's *New Chapters in Greek History*, ch. 11-14.

TWELFTH GRADE. The study of the Greek Theater will be continued by reading Sophocles' *Antigone*, 500-700, and reviewing the choruses, 100-162 and 332-384, with special attention to the way the play was performed. The subject will be studied under *chorus* in Smith's Dictionary of Antiquities and Harper's and Seyffert's Classical Dictionaries, and in Grote's *History of Greece*, ch. 67.

Latin

SEVENTH GRADE. The pupils will continue their study of Roman character and history by reading Aulus Gellius, III, 7; VII, 3 and 4; X, 6; I, 23; IV, 20; VI, 22; X 27; and Nepos' Hannibal, 1–5.

They will consult Harper's Classical Dictionary and Smith's Dictionary of Biography under *P. Claudius Pulcher*, *Regulus*, *Fabius Maximus*, *Cornelius Nepos*, *Hamilcar* and *Hannibal;* Mommsen's History of Rome, Bks. II and III, 1–4; C. W. Morris, Hannibal, ch. I–IV.

EIGHTH GRADE. The pupils will continue their study of the relation of Rome to Modern Europe by reading Cæsar's Gallic War, II, 9–21. They will also consult Froude's *Cæsar*, ch. 13 and 14; Fowler's *Cæsar*, ch. 8–10; Mommsen's *History of Rome*, Bk. V, ch. VII; Duruy's *History*

of Rome, ch. 53–54; and Plutarch's *Life of Cæsar*.

NINTH GRADE. The students will continue the study of the Crisis in the Republic by reading Sallust's Catiline, 41–61. Harper's Classical Dictionary and Smith's Dictionary of Biography will be consulted about *Cato Uticensis*, *Pompeius Magnus*, *L. Cornelius Sulla*, *M. Lucinius Crassus Dives*, and Mithradates the Great; and Mommsen's *History of Rome*, Bk. V, 1–6, regarding all these persons; and Plutarch's Lives of Cicero and Sulla.

TENTH GRADE. The study of Roman poetry will be continued by reading Catullus, 64, and Lucretius, I, 1–150; II, 1–60. The pupils will consult Harper's Classical Dictionary and Smith's Dictionary of Biography and Mythology regarding *Theseus*, *Bacchus*, *Thetis*, *Peleus*, *Achilles*, *Moeræ*, *Iphigenia*, *Epicurus*, and *Lucretius*, making an especial study of the last named in Tyrrell's *Latin Poetry*, ch. 3, and Cruttwell's *Roman Literature*, Bk. 3, ch. 4, and in the encyclopedias.

ELEVENTH GRADE. The study of Roman religion will be continued by reading Virgil's Eclogues, 9 and 1; and Æneid, I, 302–657. The pupils will consult the encyclopedias and dictionaries regarding *Æneus*, *Juno*, *Neptune*, *Mercury*, and *Carthage;* and also read Mommsen's *History of Rome*, Bk. I, ch. 11–15; Tyrrell's *Latin Poetry*, ch. 5; and Plutarch's *Lives of Romulus* and *Numa*.

TWELFTH GRADE. The study of Roman life under the Empire will be continued by reading Horace, Odes, I, 2, 3, 4, 11, 12, 22, 35; II, 2, 10, 15, 16; III, 1, 4, 5, 27, 29, 30; IV, 4, 14. Satires, I, 5 and 6.

The students can consult the dictionaries and encyclopedias on *Europa*, *Fortuna* and *Dædalus;* and read Mommsen's *History of Rome*, Bk. V, ch. 11; Tyrrell's *Latin Poetry*, ch. 6: and Pellison's *Roman Life in Pliny's Time*, ch. 1 and 9.

VII.

Τρόπος ἐσθ' ὁ πείθων τοῦ λέγοντος, οὐ λόγον. Μένανδρος.

Ὅτε μὲν Ξενοφῶν τὰ τῶν Ἑλλήνων μυρίων ἔργα ἔγραψεν, οὐδεὶς λέων ἐν Ἑλλάδι ἦν. ἐν τῷ δὲ παλαιῷ χρόνῳ ἄνθρωποι ἐθήρευον αὐτὸν ἐν ταύτῃ τῇ χώρᾳ. λέγεται δὲ καὶ ὅτι Ἡρακλῆς ἐθήρευσε τὸν ἐν Νεμέᾳ λέοντα· καὶ φόβος ἦν ἐν ταῖς τῆς Ἀργολίδος κώμαις τούτου τοῦ θηρίου ὅτι ἰσχυρόν τε καὶ δεινὸν ἦν, καὶ τὸ δέρμα οὐδὲ λίθος οὐδὲ χαλκὸς διέκοψεν. ὁ δὲ Ἡρακλῆς ἀπέκτεινε τοῦτο τὸ δεινὸν θήριον καὶ τὸ δέρμα αὐτοῦ ἐφόρει ἐπὶ τῆς κεφαλῆς καὶ τῶν ὤμων.

Τίς ἦν ὁ Ξενοφῶν; Τίς ἦν ὁ Ἡρακλῆς;

Look up *Xenophon* and *Hercules* in Smith's Dictionary of Biography and Mythology, and *Nemea* in Smith's Dictionary of Geography, and the same three subjects in the Classical Dictionaries and Encyclopedias.

VIII.

Ἄνθρωπον ξητῶ. Διογένης.

Οἱ Γίγαντες ἦσαν τῆς θεᾶς Γῆς υἱοὶ καὶ οὕτως ἰσχυροὶ ὥστε καὶ τοῖς θεοῖς μάχεσθαι. τοῦτοι οἱ παῖδες τῆς Γῆς Ὄσσαν ἐπ' Ὀλύμπῳ καὶ Πήλιον ἐπ' Ὄσσᾳ ἑστήσαντες ἐπείραν ἀναβαίνειν εἰς τὸν Οὐρανον, καὶ οἱ ἐν τῷ οὐράνῳ θεοὶ ἦσαν φοβεροὶ. ὁ δὲ Ἡρακλῆς τοῖς τοξεύμασιν αὐτοὺς ὠφέλησε καὶ μετὰ μάχην δεινήν τε καὶ μακρὰν ἀπέκτεινε πάντας τοὺς γίγαντας. περὶ τῶν Τιτάνων λέγεται ὁ αὐτὸς μῦθος.

Ποῦ ἦσαν Ὄλυμπὸς καὶ Πήλιον καὶ Ὄσσα; πῶς οἱ Γίγαντες ἐκίνησαν ταῦτα τὰ ὄρεα; τίνες ἦσαν οἱ Τιτᾶνες; τίς ἦν ὁ Διογένης;

Look up *Titanes*, *Gigantes*, and *Diogenes* in Smith's Dictionary of Biography, and

Olympus in Smith's Dictionary of Geography, and *Pergamene Sculptures* in Seyffert's Dictionary, and look up all of the subjects in Harper's Classical Dictionary and the Encyclopedias.

IX.

Οὐδεὶς δι' ἐμὲ τῶν ὄντων Ἀθηναίων μέλαν ἱμάτιον περιεβάλετο. Περικλῆς.

Περικλῆς ἦν ῥήτωρ τε καὶ ἡγεμὼν τῶν Ἀθηναίων, καί δι' αὐτὸν εἰργάσαντο τὸν Παρθενῶνα καὶ τοὺς ἄλλους καλοὺς ναούς. ὁ τρόπος αὐτοῦ ἦν σεμνός τε καὶ εὐσεβὴς καὶ ἀεὶ εὔχετο τοῖς θεοῖς πρὸς τὸ βῆμα ἴων. ἡ δ' αὐτοῦ πραότης ἦν πολλή· λοιδορούμενος γάρ ποτε ὑπὸ κακοῦ ἀνθρώπου ἐν ἀγορᾷ ὅλην ἡμέραν κατεπράττετο τὰ πολιτικὰ πράγματα σιωπῶν. ἑσπέρας δ' ἀπῄει οἴκαδε παρακολουθοῦντος τοῦ ἀνθρώπου καὶ ἔτι λοιδοροῦντος· ὅτε δ' εἰσῄει ἐκέλευσε τὸν δοῦλον φῶς λαβόντα παραπέμπειν τὸν ἄνθρωπον εἰς τὴν οἰκίαν.

Look up *Pericles* in Smith's Dictionary of Biography, and *Parthenon* in Smith's Dictionary of Antiquities; and both of the subjects in Harper's Classical Dictionary and the Encyclopedias. Read also Grant's *Greece in the Age of Pericles*, ch. 7 and 8, and Plutarch's *Life of Pericles*.

X.

Εἰσὶν μητρὶ παῖδες ἀγκύραι βίου.
Σοφοκλῆς.

Σωκράτης πότε αἰσθόμενος τὸν υἱὸν πρὸς τὴν μητέρα χαλεπαίνοντα, Τίνες ἄνθρωποι, ἔφη, ὦ παῖ, ἀχάριστοι καλοῦνται;

Οἱ δ' εὐεργετησάμενοι, ἔφη ὁ παῖς, ἐὰν δυνάμενοι χάριν ἀποδοῦναι μὴ ἀποδῶσιν, ἀχάριστοι καλοῦνται.

Οὐκοῦν, ἔφη ὁ Σωκράτης, δοκοῦσί σοι οἱ ἀχάριστοι εἶναι ἐν τοῖς ἀδίκοις;

Καὶ μάλα, ἔφη ὁ παῖς.

Ἆρα δὲ, ἔφη ὁ πατὴρ, οὐκ εὐεργετοῦνται παῖδες ὑπὸ γονέων; ἢ οὐκ οἶσθ' ὅτι τὸ παίδιον ὑπὸ τῆς μητρὸς πολὺν χρόνον καὶ ἡμέρας καὶ νυκτὸς εὐεργετεῖται;

Ἀλλ' εἰ ἡ μήτηρ, ἔφη ὁ παῖς, καὶ πάντα ταῦτα πεποίηκεν, οὐδεὶς δύναται αὐτὴν οὕτως λέγοντα χαλεπῶς ἀκούων μὴ χαλεπαίνειν.

Πῶς δὲ, ἔφη ὁ Σωκράτης, οἱ ὑποκριταὶ δύνανται τοὺς ἀλλήλων χαλεποὺς λόγους ἀκούοντες μὴ χαλεπαίνειν;

Ἀλλ' οὗτοι, ἔφη ὁ παῖς, τοὺς χαλεπῶς λέγοντας οὐδὲν κακὸν ποιεῖν βουλομένους εἰδότες, ῥᾳδίως φέρουσιν.

Οὐκοῦν, ἔφη ὁ Σωκράτης, οἶσθ' ὅτι ἡ μήτηρ σοι, εἰ χαλεπῶς λέγει, οὐδὲν μὲν κακὸν ποιεῖν βούλεται, πολλὰ δ' ἀγαθὰ τοῖς θεοῖς εὔχεται; σὺ δὲ, εἰ τοιαύτην μὴ δύνασαι φέρειν μητέρα, τἀγαθὰ οὐ δύνασαι φέρειν. τοῖς δὲ θεοῖς, ὦ παῖ, εὔξῃ συγγνωμὴν, εἰ ἐχαλέπηνας τρὸς τὴν μητέρα.

Look up *Socrates* and *Xanthippe* in the Dictionaries and Encyclopedias, and read Grote's *History of Greece*, ch. 67.

French

Lorley Ada Ashléman

During the month of October the children have evolved some recipes in the cooking classes, and have collected data in their other studies, which must be recorded. In November they will therefore begin to write single records in French. The records of all the classes bound together will make a French journal for the use of the school.

The cooking and serving will be continued and the dramatizing of stories. Children will design and make costumes for little plays.

Group I: The pupils of this group will study the serving of food, arrangement of table, and the greeting of guests for Group II, who are cooking. They will compare American customs with French customs. An excursion will be arranged to Burley's for the study of French pottery, and an attempt will be made to manufacture and decorate little dishes.

Children will record in French as much as possible of the information gained through the above work for the benefit of the other classes.

Group II: The children of Group II will keep the recipes which they have tried, thus making a cook-book for the use of other grades.

Group II will invite Group I to help in making French book-covers for the monthly journal. These covers will be Christmas gifts.

Group III: The construction of French calendars will continue. The dramatization of the story of the first potatoes eaten in France will call for the study of the manners, dress, and condition of the French people at this period. The Christmas work will be begun in the form of French bonbon bags.

Group IV will attempt two French games of cards—one based upon flowers, the other upon fruits. November scenes will be produced for Group III, who are making calendars.

The little play of La Salle will be begun. A letter of thanks will be written to the High School, thanking them for interesting reading matter on Kankakee.

French Reading Lessons

Bonjour

M. Casimir Bonjour, candidat à l'Académe, se présente un jour pour faire sa visite chez un des quarante. Une femme de chambre vient lui ouvrir la porte. "Votre nom, monsieur?" dit-elle. Le candidat répond avec son plus gracieux sourire: "Bonjour." Flattée de cette politesse, la jeune fille répond: "Bonjour, monsieur, voulez-vous me dire votre nom?" "Je vous dis, Bonjour." "Et moi aussi, bonjour, monsieur; qui faut-il que j'annonce?" "Eh, Bonjour! c'est mon nom." La caméríste comprit alors, qu'au lieu de dire: Bonjour, monsieur, il fallait dire: Monsieur Bonjour.

Antoine Augustin Parmentier

Aujourd'hui une pomme de terre semble peu de chose. Pourtant un écrivain anglais a dit: "La pomme de terre a joué un plus grand rôle dans l'histoire du monde que Malborough et Napoléon même.

Elle a sauvé la France et l'Irlande de la famine, elle a répandu la culture sur les pentes des montagnes rocheuses.

La pomme de terre transportée du Péru en Europe dès le 15e siècle, n'avait été multipliée avec succès que dans les provinces méridionales de la France. Une prévention aveugle arrêtait ailleurs les effets heureux de cet exemple. De vieux patriciens répandirent, non plus que la pomme de terre était susceptible d'engendrer la lèpre, comme on l'avait dit dans le 16e siècle, mais bien qu'elle pourait devenir une cause de fiévres nombreuses.

C'est Parmentier, le grand chimiste et agranome français qui a donné au peuple français le don précieux de la pomme de terre.

Il démontra que l'homme pouvait trouver un aliment délicat dans la fécule de cette racine que l'ignorance abandonnait exclusivement aux animaux.

Pendant la guerre de Sept Ans Parmentier, qui se trouva sous les ordres de Bayer au rang de pharmacien en second tomba cinq fois entre les mains de l'ennemi.

Ce mal de la vie des camps lui permit de concevoir l'idée qui lui donne le droit à la reconnaissance de la France.

Les prisonniers était sous stricte surveillance; on ne leur donnait que des pommes de terre.

Parmentier au lieu d'abuser sa nourriture comme ses compagnons en avaient l'habitude réfléchit sérieusement sur l'utilité de ce légume, s'informa de sa nature et de sa manière de culture.

Mis en liberté et de retour à Paris, Parmentier n'oublia pas ses études de prison. Sachant combien il est difficile de lutter contre la routine, il pensa que pour la battre en brèche il lui fallait une haute protection; cette protection, il la rencontra dans Louis XVI lui même.

Comme il se proposait avant tout de frapper l'imagination des Parisiens, il sollicita et obtint du monarque, pour l'essai qu'il méditait, 50 arpents de la plaine des Sablons.

Ces sables stériles furent labourés pour la première fois par les soins de Parmentier qui leur confia la plante qu'il voulait réhabiliter.

Lorsque les fleurs parurent Parmentier fut émerveillé de son succès. Il en cueillit un bouquet et courut à Versailles le présenter au monarque. Louis XVI accepta l'offrande avec bienveillance, et malgré les sourires moqueurs des courtisans qui l'entouraient, il en para la boutonnière de son habit.

Marie Antoinette les favorisa en les portant coquettement dans sa belle chevelure.

De ce moment la cause de la pomme de terre fut gagnée. Les grands seigneurs et les belles dames, qui jusqu'alors avaient beaucoup ri de ce qu'ils appelaient "la folie du bonhomme," s'empressèrent d'imiter l'exemple de Louis XVI et d'adresser leurs félicitations au modeste philanthrope.

Des gardes placés autour des champs excitaient la curiosité et l'avidité de la foule; mais ces gardes n'exercaient leur surveillance que pendant le jour. Bientôt on vient annoncer à Parmentier que ses pommes de terre avaient été volées pendant la nuit.

A cette nouvelle, il ne se sentit pas de joie et récompensa largement celui qui la lui avait apportée.

Il ne voyait dans ce vol commis qu'un nouveau genre de succès.

"Si l'on vole la pomme de terre," se dit-il, "c'est qu'il n'existe plus de préjugé contre elle."

Peu de temps après il donna un grand festin où parmi les notabilités de l'époque assistèrent Franklin et Lavoisier. La pomme de terre préparée sous toutes les formes y fournit seul la substance de tous les mets. Les liqueurs mêmes en étaient extraites.

C'est ainsi que, grâce aux génereux efforts d'un seul homme, la France vit la pomme

de terre se placer au premier rang des richesses agricoles.

François de Neuchâteau proposa de substituer au nom impropre de cette solanée celui de Parmentière. Mais la modestie de Parmentier s'y refusa.

Louis XVI lui avait dit "La France vous sera bien reconnaissante, car vous avez donné à manger à ses pauvres enfants."

En vérité, la France lui sait bien gré, car si vous visitez le beau Cimetière de Père La Chaise vous trouverez un tombeau tout couvert de belles fleurs jaunes, les fleurs de la pomme de terre. Vous y trouverez aussi le nom de Parmentier.

Toutes les années les français reconnaissants viennent planter le tubercule sur la tombe de leur bienfaiteur.

Construction Work in Library Economy

Irene Warren Frances Simpson

The construction work in library economy would naturally divide itself into four parts—the printing, illustrating, binding, and bibliography.

The student who makes a book, and knows why the guides, such as the table of contents, marginal notes, and indexes are put in books, will no longer laboriously turn over the pages of a book for a given reference, but at once seek the most economical means the book affords for finding such a reference.

It is possible to begin this work very early by having the children make scrapbooks, and later to bind their essays, drawings, paintings, and pamphlets, and make any necessary note-books. The course may be made more attractive by telling the children stories showing the development of book-making from the old stone and clay tablets to the beautiful books of today. There are many fascinating stories of the untiring devotion of the monks in illuminating the gospels, one of which Thomas Bailey Aldrich has told in his poem, *Friar Jerome's Beautiful Book*. The story of the invention of printing is always interesting, and also the story of the labors of Aldus Manutius. Portions of Dr. Gunsaulus' *Monk and Knight* give the idea of the devotion and sacrifice of these early workers, whose results no one has ever excelled. If possible, examples of the beautiful old illuminated manuscripts, great wooden-bound volumes, and later the dainty pocket editions with their rare bindings and wonderful black print, should be shown the students. Some of these early works of art tell of a devotion, love, and heroism that history does not often repeat.

This outline should deal with the printing and illustrating, but space will not permit, and therefore only the bibliopegic and bibliographical phases are outlined.

It seems best to have the children do that style of binding in which they can produce as good a piece of workmanship as possible. This means the simple binding for the primary grades, with an attempt toward more complex forms in the upper grades. All possible freedom should be allowed the child in choice of color, material, and style. The simplest binding is folding the leaves and lacing them into a cover like a Japanese book. This will also be found practical for any papers which are in single sheets or where other sheets are to be inserted from time to time. If the paper is thin, a narrow strip of firmer material should be pasted along the back to prevent the paper from tearing out.

Covers may be of plain paper, decorated by the children or bearing only a paper label with title and author, well lettered. In the upper grades a cover can be made of muslin or leather on a light weight mill board, lacing sheets into cover. The hinge is made by cutting the board in two where the joint is wanted.

In every book, care should be taken to have the child design a title-page and examine books to see what a title-page should contain. He should also dedicate his book, make a table of contents, list of illustrations, introduction, chapter headings, index, marginal and foot notes if necessary. In this way he will learn to use these valuable features of a book which the average student never notices.

The purpose of binding is to preserve, and it would be well to try to have the material to be bound well worth the binding. The children may bind a printed pamphlet or their own essays and drawings. If a printed pamphlet is used, it will of course already be folded, but if the essays of the children, it should be on paper previously folded according to the following directions.

DIRECTIONS FOR FOLDING: Lay paper on table, take a bone folding-stick in left hand, fold top edge evenly on to bottom, and crease, then left edge over to right edge, and crease. This makes two folds, four leaves, and eight pages.

COLLATING: See that every page is in its right place, the maps mounted on thin muslin, and all plates carefully pasted in. Then put in a heavy press over night.

SAWING AND SEWING: Take the book and knock it straight at both head and back, then place it between thin boards, the back projecting one-eighth of an inch. Put in a vise and screw in tightly. For an ordinary octavo divide the back into six equal parts, leaving the bottom part one-eighth of an inch longer, or, for a strange optical reason, it will look shorter. Take a saw and saw in just deep enough to imbed the bands on which the book is to be sewed. The first and last saw-cuts are for the kettle stitch and should not be quite so deep as the others. The book is now ready to be sewed. The sewing can be done without a frame, but much better work is possible with one. A sewing-frame consists of a bed with a slot in the front of it, two screws and a cross-bar, round which are fastened the cords on which the book is sewed. The other ends of the cords are fastened to nails by slip-knots on the underside of the slot in the bed; and the beam is screwed up quite tightly. The cords will then fit in the saw-cuts. The book is sewed one section at a time by running the blunt binder's-needle through the saw-cuts, around each band, and fastening it at the end to the former section by means of the kettle stitch. After the book is sewed, cut the cords so as to leave about two inches of cord on either side. Fray out the cords carefully.

FORWARDING: The volume is then ready for end-leaves, which are made by pasting the colored paper on to a rather heavy white paper. There is a large variety of papers for this purpose, known as Cobb, surface, marbled papers and other various fancy papers. The children may design their own end-leaves. The white fly-leaves and made end-leaves are then pasted on the book. If the volumes are at all heavy, joints should be made of binder's cloth or morocco to match the cover. The book is then ready to be trimmed.

Knives are very expensive things, and it may be necessary either to leave the edges in the rough or to take them to a shop to be trimmed. The book is glued thoroughly across the back and allowed to dry. It is next carefully rounded by putting in a vise and pounding into shape with a binder's hammer. The book is then ready for the boards. It is impossible to make any kind of a book unless good mill boards are used. The boards should project enough beyond the pages in front and back to be a protection. Two holes are then punched by an awl one-half inch from the back of the boards opposite each band. The ends of the bands are made into needles by applying paste and twisting, and are then laced into the boards. The lacings are next pounded flat and cut off. Head-bands can be bought ready for use or made by twisting colored silks round a piece of of vellum or button-hole stitching silk over the edge of a tape. The head-band is glued to the top of the back. The back is then covered

with several thicknesses of brown paper and is ready for the cover. which may be of paper, cloth, or leather.

FINISHING: The putting on of gold letters and designs is a very difficult process, and could only be done by the oldest pupils. It is, however, possible for the children to do considerable decorating and lettering in other ways. Generally it is possible to make satisfactory arrangements with job binders to furnish the necessary supplies for such binding as is done in the schools. They are usually willing, also, to do the necessary cutting of material.

MACHINERY AND SUPPLIES: The following is a small outfit for a bindery. It is, however, possible to do very fair work in a school-room with less machinery. Prices vary considerably, and are, therefore, not given here, but they may be readily obtained of any firm dealing in binders' supplies:

1 pair of compasses. 1 square. 1 bone folder. 1 glue-pot and brushes. Paste-pot and 2 paste brushes. 2 cutting and paring knives. 1 pair of editor's shears. 1 awl for stabbing. 1 gas stove. 1 forwarder's hammer. 1 edge scraper. 1 sewing bench, 24 inches between screws. 2 12-inch backing boards. 1 lettering pallet. 1 fillet roll. 1 finishing press. 1 gold cushion. 1 small standing press. 2 sets of brass types. 1 package of binders' needles, 1 blunt, and 1 sharp. 1 pound each of Hayes' Irish linen thread, Nos. 18, 25, and 30. 1 pound each of soft twine, Nos. 3 and 4. 1 bundle of tar boards and one of straw boards. 1 package of gold-leaf. Canvas, cloth, leather, and papers.

References: The following list of books will be found helpful in practical binding, and also for the history of book-making. Zaehnsdorf gives the best practical description of binding:

Aldrich, *Friar Jerome's Beautiful Book*, Houghton; Bouchot, *The Book; Its Printers, Illustrators and Binders*, Grevel; Gunsaulus, *Monk and Knight; Historical Study in Fiction*, McClurg; Horne, *Binding of Books*, Kegan Paul; Matthews, *Book-Bindings, Old and New*, Bell; Putnam, *Books and Their Makers in the Middle Ages*, 2 vols., Putnam; Zaehnsdorf, *Art of Book-Binding; a Practical Treatise;* Technological Handbooks, Bell.

Number as Related to Meteorology in the Primary Grades

Flora J. Cooke

During the past month several letters from teachers have been received inquiring as to the value of keeping a daily record of the local weather conditions and amount of number work necessitated by such work in the primary grades.

Judging from the interest thus manifested and the number of symbolic and pictorial charts and calendars which have recently appeared in the kindergartens and schools of New York, Boston, Washington, Minneapolis and San Francisco, this is a subject of universal interest to primary teachers at present.

There seems to be but one general answer to the questions stated above: To be really valuable and educative this work must directly feed the child's genuine joy and appreciation of nature's phenomena. He uses number only because it will help him to find out what he wants to know.

If, on the other hand, this subject is chosen merely because it affords an opportunity to drill the children in fractions or so-called fundamental processes of arithmetic, wooden blocks would be a much more direct means to the end desired and the child's attitude toward nature would be less apt to be strained and pretentious.

In last year's *Inland Educator* a somewhat detailed outline of this phase of our work was given, and because it answers most of the questions asked, part of the article is quoted below.

In all of this work it is the teacher's duty to judge from the attitude, experience and questions of the children what they will care to measure definitely and what is worthy of their efforts. As in the choice of reading, she must examine their fundamental interests for help. The following work in meteorology might well be criticised as being too analytical for little children, because the motive for the selection of this work and the great variety of devices attending the study are not given. Some of the children got nothing from it but the habit of looking daily with pleasure at the sky, water, plants and animals in their environment; but surely such observation was not wholly without good effect, and incidentally the work provided opportunity in almost every line of activity which children enjoy. They made and regulated their own weather signal-flags, rain-gauges, etc. They expressed their observations by means of writing, drawing, painting, colored crayon illustrations, plays, dramatic personification and original stories. Selected stories, poems, songs, rhymes, and riddles constantly allowed the same things, in another form, to act upon them, and the test of the value of the work came in the children's increasing delight in and their desire to know more about these familiar things.

The following outline presents the number aspect of the work in meteorology for an entire year, as all the questions asked pertain to this phase of the work.

The examples, though crude in themselves, yet use number only for its one purpose—to make some mental image clearer.

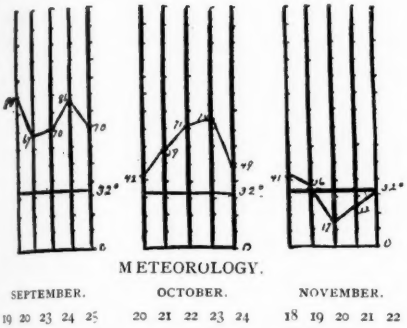
TEMPERATURE.—The children judged that it was cooler in the shade of trees and in the house than in the sunshine. To verify their judgments the use of the thermometer as a tool for measuring heat was necessary.

The numbers and lines upon the thermometer may be read: zero, 1 ten, 1 ten and 2, 1 ten and 4, 1 ten and 6, 1 ten and 8, 2 tens, three tens and 6, 4 tens; and the names twenty, thirty, forty, etc., reviewed until the children are familiar with their meaning. This makes the reading of the thermometer perfectly simple.

The children recorded the outside temperature and that of the room at a given time every day. They discovered the temperature of the soil at a certain depth, where the ants live, where the earthworms live, and in the garden, where the vegetables live. They compared the temperature under their trees with that in the sunshine, that of the water at the surface with that at the depth where the fishes live.

The record of all these experiments was kept upon a large chart, and used for reference by the children. At the end of each month they were able to construct simple charts for their individual records. A series of parallel lines with dots at regular intervals were drawn to represent the scale of the thermometer by tens. At the 32 point and at the zero point lines were drawn all the way across the chart. At the top of each line stood the number indicating the day of the month, and above all stood the name of the month. By connecting the temperature recorded at, say 9 A. M. one day, with that on succeeding days the record was completed. These data were gathered by the children and recorded daily at 9 A. M. The children noted the direction of the heat line in each case. They compared these charts with their paintings of landscape, plants, and animals during these months, also with the data of their sunshine charts. In many cases the children discovered the relation between the descending heat line and the changes which they had recorded.

TEMPERATURE CHART. — The children constructed a chart upon which they recorded the number of clear, fair, cloudy,



rainy, and snowy days in September, October, and November. They obtained the data from their large schoolroom charts, which were the results of their own daily observations. Upon these charts the clear days were represented by bright yellow circular disks, the fair days by dull yellow, the cloudy days by dull gray, the rainy days by dark gray, the snowy by light gray. The disks were all of a uniform size. They were cut and pasted upon the chart in such a way as to show plainly, through the different coloring, the changes in each day and thus in each month. Frost was represented by a small white circle. Each month's chart was the size of the leaves of their books—11 by 8½ inches. After a half-inch margin was taken off from one end and side, the space was divided into three equal parts—one for September, one for October and one for November. See outline for Nature Study, October COURSE OF STUDY, page 128.

The children made a working plan upon the blackboard before using the material designed for the chart. They divided each month's space into four equal parts—one for clear, one for cloudy, one for fair and one for rainy and snowy weather.

They counted up the entire number of days of sunshine in each month—fair, cloudy, etc. With their self-made circle-makers they constructed the necessary number of circles in each column to represent the number of clear, fair, cloudy or stormy days in each month. They painted these circles the colors of the disks upon the large charts; they experimented in mixing the paints, under the teacher's direction, until they got the exact representative colors.

When any (normal) child found difficulty in counting up the number of clear days—that is, if the adding or combining of the fractional parts of the disks troubled him—the teacher stopped and allowed all the class to help the child overcome his difficulty. As many devices were used and as long a time taken as was necessary to make the work perfectly clear to him. Through this work the children had vividly impressed upon them, with the help of the landscape painting, temperature charts, etc., the general characteristics of the fall months. For instance: September had only four cloudy school days, while November had ten and one-eighth. September had twice as many clear days as November. In September the heat line did not come nearer than 12° of the freezing line. In November it was one-fourth of the time below it. September had green grass, green leaves, many flowers, birds and insects. In November, the grass was withered, the trees bare, there were few birds, no flowers, and no insects. And thus, as many of his images combined constantly into an ever expanding image, the child unconsciously grew to feel the relative importance and interdependence of these things, and his own relation to them all.

During the spring months the first grade children were given the opportunity of expressing their observations through the medium of their newly acquired power in the use of a printed vocabulary. This had the advantage of requiring them to express themselves, individually and independently, as they searched out the sentences which they thought corresponded to

the weather conditions, and arranged them upon their disks in such a way that they might be easily read and compared.

This tested not only the accuracy of their observations but their power to recognize and associate correctly ideas and their appropriate symbols. It also created a real necessity for reading, too often absent from such exercises.

The children needed a receptacle of some kind to hold the words and sentences used in this work, and the following box was chosen as the most convenient form for it :

WEATHER BOX.—(dimensions in inches). Nine small boxes 4x1x1, one large box to hold the small boxes 12½x3½x1. The small boxes were labeled "Day of Week," "Months," "Wind," "Clouds," "Temperature," "Rain or Snow," "Frost or Dew," "Dates," and contained sets of sentences upon the subject indicated by the label.

The child of course utilizes and applies the knowledge thus gained in his other phases of nature study and in his history and geography work. As each study requires quite as much number for the formation of clear images, the only question seems to be to discover the necessity for definite images in the various subjects studied. The only sure guide as to their relative value is to note how actively such work influences the immediate life of each individual—that is, how much he actually uses the results of his work.

Answers to Questions

"Is it possible for children to study many subjects and obtain good results?" —Parent.

That depends. If the gaining of certain amounts of knowledge is the purpose of study, scraps of knowledge, superficial ideas only will be acquired; the powers of the pupil will be dissipated; the true purpose of knowledge will not be appreciated. Therefore, artificial and vicious stimulants for effort must be used.

If the motive of teaching is character, citizenship, community life, complete living, then knowledge becomes intellectual nutrition, by use. That knowledge will be selected for each pupil which he needs, that skill in expression which he must have to use his knowledge. There is not the slightest danger of over-burdening if knowledge is acquired under the right ideal.

"Why do some children hate mathematics?"

Because they have no use for it.

Kindergarten

Anne Elizabeth Allen

Law and Order, Continued. This month, the time for doing everything and the order observed in the home industries; the timekeeper; home preparations for winter, viz: storing of coal in basements, canning fruits, providing warm bedding and clothing, will directly supply the material for our work.

Out-of-door changes: Nature's preparations for winter will be daily observed in our excursions into the park.

Preparations for a Thanksgiving festival will begin early in the month. Teachers and children will visit the market, selecting fruit to make jelly of. The children will bring recipes for making it from home

and will prepare the fruit, measuring and proportioning the amount of sugar needed, and the teachers will take the mothers' part in cooking and straining.

Boxes will be provided in which to store nuts, apples, oranges, and popcorn. Fruit will be prepared, corn popped, and tables set by the children for their Thanksgiving feast, as many of the children from the primary grades and the parents of the kindergarten children will be our guests.

This will be our first formal entertainment of the year, and committees of the children will be formed and they will be encouraged to plan for themselves and to feel their responsibility as hosts and hostesses, the teachers giving aid only when necessary.

We shall gather autumn leaves from the park and such grasses as may be found for decorations for the day we celebrate in the school; and here again the children will be made responsible for the gathering, preserving, and arranging of all decorations under the guidance of the Art teachers.

Topics: Timekeepers, watches, clocks, and people.

1. Order in home life: time for rising, breakfast, lunch, dinner, play, and going to bed. Time for milkman, grocer, postman.
2. Order out of doors: time for sunrise, noon, sunset; night, starlight, moonlight.
3. Time for changes in weather: change from fall to winter; time to snow; indications of weather changes.
4. Time for changes in nature: trees, flowers, and grass.
5. Time for changes in clothing: heavier coats, hoods, mittens, overshoes, and mufflers.
6. Time for storing up provisions for winter.
7. Thanksgiving, with its obligations.

Materials: Large blocks, clay, sand, paints, circular and square tablets; gas stove, jelly glasses, fruit jars; fruits, nuts, popcorn, black board and crayons.

1. Large blocks: Building kitchens, storerooms, pantries, basements.
2. Clay: Modeling glasses and jelly fruits, and modeling and decorating dishes.
3. Sand: Making ground plans of cellars, bins, and preserve closets.
4. Tablets: Tops of tables of different shapes and sizes, according to number to sit at table, made of square tablets, and plates and cakes made of circular tablets.

Games: Oh, See the Cook in the Kitchen; Kitchen Clock; The Little Housewife; Guessing Game; Dancing Game; Old Thanksgiving Game.

Songs: *Whisk, Frisk, Run*, Hill's Songs; *Migration Song*, Hill's Songs; *The Tea Kettle*, Gaynor Songs; *Pit a Pat*, Gaynor Songs; *The Land of Nod*, Gaynor Songs; *The Popcorn People*, Gaynor Songs.

Stories and Poems: *Wynken, Blynken, and Nod*, by Eugene Field; *Which was Happiest? Story of the First Thanksgiving.*

Rhythm: Skipping alone, in circles and in line; marching to different rhythms.

Instrumental Music: *Five Marches for the Kindergarten*, Eleanor Smith; *Instrumental Characteristic Rhythms*, Parts I and II, by Clara Louise Anderson; *The Graduate's March*, by A. D. Scammell; *Wilder Reiter*, Schumann.

First Grade

Harriet T. B. Atwood

History: I. Study of home activities continued. During November the children will construct and decorate the walls of the miniature home begun in October. They will make original designs for wall decoration. Opportunity will then be given for seeing the decorations in the different school-rooms of the building, and a visit will be made to a School of Design if possible. The symmetroscope will also be used to aid the children in making conventional designs of such natural ob-

jects as they may choose to make use of. After discussion and comparison of the first designs, each child will be allowed to make his final design for the decoration of each of the rooms he has planned, and he will then proceed to decorate the walls accordingly.

II. The Story of the Pilgrims.

1. The Voyage: Pictures of the ocean, the ship and the people aboard.

2. The people whom the children should know: Priscilla, Miles Standish, John Alden, William Bradford, and Peregrine White.

3. The Landing: Pictures of the New England landscape in midwinter.

4. The Pilgrim's home-building: Making of a log house to a definite scale. Comparison with the wigwam.

5. Dress, manners, and customs in the Plymouth colony.

6. Customs of the Indians.

7. The work and play of the Pilgrim children.

8. Dramatic representation of scenes in the lives of the Pilgrims. Making of costumes by the children.

9. The story of the First Thanksgiving Day.

Literature: Some of the stories used during November will be: *The Three Squirrels*, adapted by Gudrun Thorne-Thomsen; *Hermes*, Cooke's Nature Myths; *Ulysses and the Bag of Winds*, Odyssey. Also, descriptions of Priscilla, Miles Standish, John Alden, and of the return of the Mayflower, from Longfellow's *Courtship of Miles Standish*.

Geography: Study of the New England landscape by means of pictures and lantern slides.

Recording of changes noted in the typical areas studied in October. (See October outline.) Further classification of material collected on field trips.

Nature Study: 1. Study of the November landscape by means of daily pictures on the blackboard.

2. Study of direction in connection with daily observation of the direction of the wind.

3. Recording of changes noticed in animal coverings as cold weather approaches.

4. Experiments in preparation of corn-meal, oatmeal, cracked wheat, flour, etc., from grains brought home from the farm. Experiment in the primitive Indian ways of grinding, cooking, and preserving corn.

5. Observation of the trees selected for study. Recording of last year's growth of twigs. Painting of twigs showing fall condition of buds.

Correlated Number: 1. Making of plans for walls of playhouse, portfolios for holding children's work, boxes for holding minerals.

2. Measurement of last year's growth of twigs from trees selected for study.

3. Measurement and recording of weights of children. Comparison with weights of October 1st.

Reading: 1. Sentences written on blackboard.

2. Printed lessons and records in connection with work in the central subjects, such as: Description of the visit to the farm. Description of the Mayflower. Directions for making the portfolios.

3. Selected stories:

The Ant and the Grasshopper, Lights to Literature.

The Wind and the Sun, Æsop.

4. Cook County Normal School reading slips.

Writing, Spelling, English: Recording of things seen on field trips; observations concerning changes of outdoor landscape; recording weights of children; placing words in dictionary; descriptions of regions visited; reproduction of stories in writing; constant incidental training in oral language.

School Economics: Care of school-room. Cooking of simple cereals. (See Miss Cooke's Outline.)

Art: Illustrating stories; painting, modeling, and paper-cutting; painting of November landscape; making of designs for decoration of walls of playhouse; blackboard illustration with colored crayon; painting of trees selected for study.

In illustrating the Pilgrim stories the children will work to decorate the wall space in their school-room. The probable outcome will be the picture of the First Thanksgiving feast which the Pilgrims shared with the Indians.

Industrial Art: Making Pilgrim costumes; basting hems for table-cover and curtains for book-shelves.

Dramatic Art: 1. Dramatic representation in costume of scenes in the lives of the Pilgrims. Training in hearing and reproducing sound.
2. Oral Reading—poems for memorizing:

What the Winds Bring, Stedman; *Windy Nights*, Stevenson; *Thanksgiving Day*, Child.

Music: *We Plough the Fields*, p. 24, Eleanor Smith's Songs for Little Children; *Jacky Frost*, p. 80, *The Squirrel*, p. 30, *When the Little Children Sleep*, p. 86, *The Elephant*, p. 52, *The Snowbirds*, p. 35, *The Trees*, p. 10, *Earth's Dresses*, p. 54, *Jumping Johnnie*, p. 46, *Bells that Hang High in the Steeple*, p. 34, Primer, Modern Music Series.

Manual Training: Making of walls for playhouse, boxes for minerals, portfolios for holding work, model of Pilgrim's log cabin.

During this month the children will select and begin to make their Christmas gifts, the plans for which will be found in the December outline.

(See also Manual Training Outline.)

Physical Training: 1. School-room exercises: Position, standing, and sitting; breathing exercises; skipping with the kindergarten.

2. Work in gymnasium: Prescribed work for individuals; class gymnastics; marching; primitive games.

References: Fiske, *Beginnings of New England;* Moore, *Pilgrims and Puritans;* Drake, *On Plymouth Rock;* Cheever, *The First Fast Day and Thanksgiving;* Longfellow, *Courtship of Miles Standish;* Austin, *Betty Alden;* Austin, *Standish of Standish;* Coffin, *Old Time in the Colonies.*

Second Grade

Antoinette B. Hollister

History: The subject of cave men, begun in October, will be continued through November.

A study in detail will be made of the life of these people, together with their manner of procuring, preparing, and serving food. The children of the Second Grade will prepare and serve to the children of the Fourth Grade berries, nuts, and other forest products with such facilities only as the cave men may have had.

In the cave constructed in October a place will be arranged for a fire and for beds, for which coverings will be made of skins.

Clothing of skins will be made for the clay representations of cave men.

Children will study the decoration on the tools and implements of the cave men, and will use similar designs for the decoration of their Christmas gifts.

Picture-writing of primitive peoples will be used as a basis for games which involve drawing as a means of communication.

Beginning of transportations — invention of boat.

With the puppet theater and by dramatic representation one group will picture for another the domestic life of the cave men.

Literature: Waterloo, *Story of Ab;* Fairchild, *Curious Ways of Getting Food;* Ernest Seton-Thompson, *Wild Animals I Have Known.*

Geography: Climate as it affects animal and vegetable life. Forests of tropical, temperate and frigid zones. Animals of these regions.

Adaptation of animals and of vegetation to changing seasons and varying temperature.

Nature's devices for the protection of animals and of vegetation against extremes of temperature and excessive moisture.

Homes of animals in different zones.

The above topics will be studied by means of stories, pictures, and frequent visits to the menagerie and botanical gardens of Lincoln Park. Children will give to the class in the form of reading lessons, by means of modeling or painting, or in conversation, the result of their observations and experiences with animals. They will record in any way which may seem best to them the seasonal changes in vegetation which they may observe, and any changes (due to a change of season) in the appearance or habits of animals.

Science: Animal coverings.

Adaptation of coverings to climatic conditions, to environment.

Function of color in coverings.

Use to man of animal coverings. Skins, wool, fur, and feathers.

Seasonal changes. Moulting, shedding; changes in color of coverings.

Homes of animals.

Migration and hibernation.

Children will note the disappearance of birds and the preparation for winter of the animals in Lincoln Park. The study of coverings will begin with a discussion of the clothing worn by the children, and the seasonal changes that are made in it. They will decide upon a material that seems best for any given season and give reasons.

Tests for warmth will be made of wool, cotton, and silk, with the thermometer. Tests will also be made upon ice or snow with material of different colors in order to discover which colors absorb and which reflect heat. By means of stories, pictures, and excursions, children will become familiar with the various steps in the manufacture of clothing from raw material. They will weave on the looms made in October fabrics which may be used in making Christmas gifts.

Number: The sloyd of this month will necessitate the study of the units of measurement, and of such simple mathematical operations as are involved in the making of working drawings and in the actual manufacture of the articles.

Reading: Children will have hours in the library when each child will have an opportunity to collect, through his reading, some information upon any subject which especially interests him or the class. These facts he will be allowed to present to the class in any way that may seem best to him.

Much of the reading will be in the form of simple directions for work, of announcements, etc. These will be written upon the blackboard or given to the children on printed slips.

Writing: Some of the work of the children will be recorded in writing for future reference or for presentation to other children. An effort will be made in all writing to secure correct position, and easy and rapid movement.

Language: Correct language will be required in all oral and written expression.

School Economics: The care of the room and of materials, in so far as it devolves upon the children, will be assumed by committees, who will be held responsible for this work. Committees will be allowed to make simple rules to secure order and cleanliness in the school-room.

Art: An attempt at school-room decoration will be made by the older children of the school and the Second Grade will be asked to assist in some of the operations which require little skill.

Aside from this, the work of this month will consist largely in the decoration of articles to be used as Christmas gifts, and the character of it will therefore be determined by the children themselves.

Industrial Art: Each child will weave on his loom some article of which he or some of his friends have need. Each will choose his own colors and design his own pattern. Jars of clay for use in the school-room will be manufactured and decorated by the children. They will make dust-cloths, etc., for use in the school-room as directed by committees.

Music: *Lullaby*, Brahms; *The Fall Leaves*, Songs and Stories for the Kindergarten; *Song of the Shearer*, Songs of the Child World, Gaynor; *Golden Rod*, Eleanor Smith.

Manual Training: The children are to select for themselves articles to be made during the month of November.

Physical Training: See October Outline.

Third Grade

Gertrude Van Hoesen

History: The wanderings of Ulysses continued. His preparation for returning home. Stories of his misfortunes on the journey, as: his adventures with the Lotus-eaters, King Æolus, Circe, and Scylla and Charybdis. In every case the motive back of the story-telling is the study of character; the contrast between the savage and civilized conditions very often offering the explanation for the act involved.

The story of Calypso. The aim will be to make as vivid as possible the beautiful pictures of Calypso's surroundings, — her cave and garden. With the conditions of the island before them the children will be asked to invent means for Ulysses's escape, — make the raft and work out the invention of the ship, afterward making a Greek ship of cardboard from pictures.

Other stories of courage and heroism will be told, comparing the action with those of Ulysses as to motives or kind of courage.

Geography: The water supply of Chicago. The water supply is also one of the most important problems in the building of a city. From the knowledge of the children as to the water of Chicago, and the more simple modes of obtaining it outside of the great cities, they will be led to more clearly understand the complicated system of Chicago. Comparisons will be made with the water system of the Homeric cities as an aid in the interpretation of our more intricate system.

How do we get our water in Chicago? Whence does it get into the faucet? Before trying to understand the water system of Chicago get the experience of the children concerning more primitive modes, as: 1, springs; 2, wells: (*a*) pumps; (*b*) well-sweeps; (*c*) chain or rope and bucket.

How did the water get into the spring and well? Take the children to one of the great pumping stations of the city and let them see the large pumps continually sending the water into the pipes. By means of pictures and descriptions lead the children to image the system from crib to faucet. An excursion to the crib will be very helpful, if it is possible. Tell the children the story of the construction of the first crib and tunnel.

Nature Study: The November landscape will be the basis of the Nature Study for the month. Continue the observations begun in October on trees, flowers, birds, insects, etc., keeping a more careful record of the weather. Classify the animals of Lincoln Park as to their modes of preparation for winter under natural conditions.

Continue work on constituents of fruit and vegetables.

Special Point — Chemistry of Decay. Cause of the changed landscape. What is happening to everything around us? In order to lead the children to see that the fall of the leaves, the passing away of flowers and grass is not loss, perform a few simple experiments, to show that the plants are simply breaking up into their elements. 1. Experiments to show that CO_2 passes off in decay. Experiments showing other sources of CO_2 to be: (1) fire; (2) breathing; (3) disintegration of rock. 2. Experiments showing that after decay is over ash or mineral matter remains.

Correlated Number: 1. Average temperature for October, necessitating addition and partition. Comparison of average temperature of the first week with the last. Does that in any way explain the change in the landscape? 2. Average temperature for the different weeks of November. 3. Experiment showing the capacity of each child's lungs in pints and quarts. Find the amount of CO_2 that each child exhales in one breath; the entire class. Point — necessity for ventilation.

Reading: Selections from all sources correlated with the other work, and with the children's interest in myth and fable.

Writing and Spelling: Records of all nature observations and experiments. Descriptions of our water system and other modes of obtaining water. Dramatization of stories in written form.

School Economics: The formation of committees for the care of the room and material; also for the preparation and service of the lunch.

Cooking: See Miss Cooke's Outline.

Art: The record of the changing landscape in color. Study of individual trees. Painting and modeling of fruits, vegetables and animals. Illustrations of stories in color, chalk, and clay.

Industrial Art: Christmas work.

Dramatic Art: Dramatic presentation of some of the scenes in the travels of Ulysses, as his visit to Circe's Palace. Training in hearing and producing English vowel sounds. Poem to be studied and memorized: *Time to Go*, by Susan Coolidge.

Music: See Miss Goodrich's Outline.

Manual Training: The Christmas work will be planned and begun in November. The plans will be in the December Outline.

Models of different kinds of wells will be made.

Physical Training: Continue October work.

Fourth Grade

Clara Isabel Mitchell

The work of the Fourth Grade will be a continuation of that outlined in the COURSE OF STUDY for October; woodworking, cooking, weaving, needlework, elementary bookbinding, drawing, painting, modeling, care of plants and animals, and field excursions.

The so-called lessons and recitations will be discussions, reading, writing and laboratory experiments planned as helps to the working out of the problems arising in the daily work.

Games, plays, music, and gymnastic drill will be recreative as well as educative.

Cooking: The cooking will be the preparation of corn for the table; parching, boiling, and grinding. The food successfully prepared will be served as part of the morning luncheon.

Book-Binding: Christmas work will begin this month in the making of books containing prints, or original drawings by the children with their own stories and explanations. Paper covers will be designed and decorated by each child to suit his idea of the contents.

Weaving: Basket fiber will be colored with aniline dyes and woven into baskets for Christmas presents.

Woodwork: Wooden calendar frames and wooden boxes and trays for Christmas presents will be made in the shop.

Metal-Working: If experiments in metal-working give satisfactory results, the children will commence trays of beaten brass for Christmas gifts.

Sociology and History: Excursions into the city will continue throughout the month for observing the great activities of city life and the people engaged in them. Carrying out the plan indicated in the October outline, the children will learn as much as possible of the lives of the different colonies in Chicago. By means of pictures, stereopticon views, stories, and descriptions they can know also something of the countries from which these people emigrated. This will lead to the question of the cause of emigration to Chicago, a question which can best be understood through the study of Chicago's history, which gives explanation of all colonization from the beginning. The history of Chicago will be studied, therefore, for better understanding of the city we live in, of what it means to its people, and what it may mean. The work in Geography and Meteorology of the previous month having given the background of climate and topography, the class will be prepared to begin the study of history. It is probable that the work already outlined will occupy all of the month; certainly not more will be done than the merest preparatory reading about the aboriginal Indians of the region.

Geography: The Geography following the need of the history lessons will be

stories and descriptions of the sea; pictures of the sea; dangers and uses as a highway for travel; water-routes to Chicago from the countries studied and read about; lives of sea-faring men; pictures of the animal and plant life of the sea; its work in building and wearing away continents. Lessons correlating the geography, history, and sociology of Chicago will connect the corn industries — farming, transportation, milling, baking, buying, and selling — with the children's own experience. These will be given through pictures of the corn regions of the world, railroad and shipping maps, visit to a mill, the board of trade, and a feed-store.

Sewing: Hemming, running, and felling will be taught in making denim book-bags for First Grade children.

Nature Study: As a help to the cooking, the children will learn the iodine test for starch and the heat test for albumen—the chief ingredients of corn. The use of starch and albumen as food for the germinating plant will be studied in the seeds planted in the school-room.

Continuing the observations of the weather conditions of this region, attention will be specially directed to clouds, rain, and snow fall. Experiments in the laboratory will be planned to explain evaporation and condensation of moisture. The November landscape will be painted as part of the weather record.

Arithmetic will be used to make clearer the relationship of heat to evaporation and condensation of water. Equal quantities of water under differing degrees of temperature will be measured for amount of evaporation. The gill, pint, quart, and gallon will be used as measures, also the cubic centimeter and decimeter. Results will be stated in terms of fractional parts and per cents. Accounts of materials and cost will be kept in an account book and made the basis of arithmetic lessons.

Reading and Dramatic Art: Many selected stories and poems appropriate to the Thanksgiving season will be told and recited in the morning exercise by students of all grades. The Fourth Grade will read and dramatize Hiawatha's Fasting as appropriate to the study of corn; they will study the stories and folk-lore of the nations represented in Chicago, among them stories from *Cuore*, as pictures of the school life of Italian boys. They will continue the story of Siegfried as a characteristic Scandinavian myth.

Music: Making of original songs will continue as begun in October. Trade songs will be taught by rote in connection with excursions to the industries of the city.

Songs: *Harvest* (hymn), Songs of Life and Nature, p. 186; *We Plough the Fields*, Eleanor Smith's Songs for Little Children, p. 24; *Wind Song*, Modern Music Series, First Book, p. 94; *The Months*, Modern Music Series, Third Book, p. 174; *Sing a Song of Workshops*, p. 20, *The Blacksmith*, p. 90, Modern Music Series, Primer.

Entertainment: Stories, pictures, drawings, descriptions, songs, games, and plays will be planned as entertainment of other classes to be invited into the Fourth Grade room.

Games and Plays: Directed play will be a part of each day's program; games chosen by the children, sense games suggested or invented by children or teacher; marches, runs, and skips in rhythm; dancing.

Excursions: Excursions will be made to the Art Institute to see the pictures of the artists of other countries, especially those best known and loved by the foreigners of this city; to the Academy of Sciences and Field Museum to see the Indian collections; to shops to see Eastern rugs, pottery, and metal-work; to a shoe-shop, a bindery, and a clothier's sweat-shop, if possible.

Drawing, Painting and Modeling: Stories and subjects of lessons will be illustrated when interesting enough to arouse feeling sufficient for such expression. There will be modeling and baking of primitive dishes like those once made by the Indian tribes of this region. These will be decorated with paints in original designs. Christmas gifts will be decorated with the children's own patterns. Illustrations will be drawn or painted for the Christmas books which are to be written, with favorite stories or pictures as subjects.

Physical Culture: In the school-room special exercises will be given for improvement of children's standing position; games of hopping, throwing, and jumping, specific training for running, jumping, and vaulting will be given in the gymnasium. The games will be battle-ball and curtain-ball.

Fifth Grade

Willard Streeter Bass

History

Subject: The development of local self-government and of a representative central government in New England.

The Tendency of the Puritans to Settle in Towns. Draw a map showing the sixteen towns founded in Massachusetts before 1634. Consider the causes of the existence of separate towns: (1) Emigration of church congregations in a body; (2) Geographical conditions favorable to commercial independence.

Organization of Town Governments. Consider difficulty of having the towns governed from Boston and the love of the people for independence. Describe the origin of the town meetings in Dorchester and Charlestown. (The children will organize and act out a town meeting, electing the town officers, voting money for highways, schools, etc., and doing other necessary business.)

Dispersive Forces in Massachusetts. Describe the religious intensity of the age, its productiveness, its different religious opinions and intolerance. Show that the Puritans, having come to Massachusetts to found a state according to their interpretation of the Bible, felt compelled to banish all those who held and taught opinions conflicting with the principles upon which their government was established; and show how these differences of opinions and banishments led to the formation of new colonies.

Roger Williams. Tell the story of Williams' trial and banishment and the founding of Rhode Island.

Joseph Hooker. Describe the rivalry between Hooker and Cotton, the discontent of the settlers at Newtown and their resolve to emigrate to the valley of the Connecticut. Show pictures of and describe the Connecticut valley and their journey there.

John Davenport. Tell how Davenport came to Massachusetts with a party of Londoners, and not finding favorable conditions there, went to New Haven to establish his ideal state.

Maine and New Hampshire. Settlements had been founded in these two states by Gorges and Mason. The religion was in general that of the Church of England, and hence utterly opposed to that of the Puritans.

The New England Confederacy. Draw a map showing the position of the various New England colonies and of the Dutch in New York and the French in Canada. Show that there was danger of attack from both of these and from the Indians as well, and that on account of domestic disturbances little help could be expected from England in case of war; hence the need for a union of the Puritan colonies. Describe the meeting of delegates from Plymouth, Connecticut, and New Haven with those of Massachusetts in Boston, and the formation of the United Colonies of New England. Discuss the importance of this union in itself and as a model for the confederation of the thirteen colonies in 1774 and for the United States.

The Colonies and the Indians. Recall the treaty of Plymouth with Massasoit and how well it was kept. Tell briefly the story of the Pequot war. Show the intention of the colonists to deal fairly by the Indians, as expressed in laws regulating trade with the Indians and purchase of land from them, and in attempts to convert them to Christianity. In spite of these intentions the Indians became fearful of extinction, and under the leadership of Philip formed a coalition for the purpose of exterminating the whites. The result—the terrible King Philip's war—was a victory for the white men.

Education in the Colonies. The serious purpose of the Puritans is shown by the founding of Harvard College and the "faire grammar school" in 1636 (the year of the Pequot war) and by laws requiring parents to educate their children (passed in 1642) and requiring towns to establish schools (passed in 1654).

Industries and Home Life. Let the children continue the work in spinning, weaving, candle-making, etc., begun last month, and keep them always in touch with the home and industrial life of the colonies.

Thanksgiving Day. Describe the circumstances which led to the first Thanksgiving Day, and show how the present national observance of the day typifies the national extent of the Puritan institutions of local self-government and representative central government.

Writing: Reasons for the formation of the New England Confederacy.

Art: Drawing and painting of scenes from colonial life. This will involve some study of the architecture and costumes of the people

Industrial Art: Spinning of wool, weaving of homespun, making of Puritan costumes.

Manual Training: Making of a colonial loom.

Reading: *The Puritan Boy* in *Ten Boys on the Road from Long Ago to Now.*

Speech, Oral Reading and Dramatic Art: Dramatic representation of an old New England town meeting; selections from *Miles Standish.*

Music: Song. *Duke Street,* School Hymnary p. 155; *Thanksgiving Hymn,* Songs of Life and Nature.

References: For Maps. Eggleston, *The Beginners of a Nation,* pp. 275, 296, 343; Drake, *The Making of New England;* Charles Carleton Coffin, *Old Times in Colonial Days.*

Geography

Subject.—Glaciers and Glacial Action about Chicago. (Continued.)

Study of Present Glaciers.

I. Alpine Glaciers. Show pictures of glaciers, with moraines, crevasses, etc. Read descriptions of the glaciers. Discuss motion of glaciers: 1. Cause, excess of yearly snowfall over melting. 2. Manner, like a river, *i. e.* faster at the top than at the bottom, and in the middle than on the sides. 3. Effects (*a*) on the ice itself, structure; (*b*) on the ground under and at the sides of the ice, striations, polish, etc.; (*c*) on the material carried on, within, and under the ice.

Show pictures and read descriptions of Arctic glaciers. Discuss their motion, showing that no mountains are necessary for the motion of these glaciers.

II. Can the Appearances Observed at Stony Island be explained by Glacial Action? (*a*) Are the drift, striations, etc., observed similar to those produced by modern glaciers? (*b*) If the effects observed are due to glaciers, from what direction must the glacier have come?

The great North American glacier, its extent, the possible causes of its origin, the results it has produced.

III. Topography of New England. Study the characteristic features of the New England landscape by means of pictures. Compare the effect of glaciation in that section with its effect about Chicago. Make a sand map of New England, showing its position with regard to the river basins of the St. Lawrence and Champlain and the Hudson. Locate on this map the settlements studied this month, including the French and Dutch as well as the Puritan colonies.

Number Work: Compare the size of glaciers, as the Muir Glacier and the Mer de Glace, with each other, and with familiar objects. From the size of the glacier and the weight of a cubic foot of ice, find the weight of one or more of the glaciers considered.

Compare the lengths of the Hudson, Champlain, and St. Lawrence rivers.

Writing: Reasons for thinking that a great glacier once covered the northern part of North America, and a description of its action.

Modeling: Modeling of sand map of New England.

References

Kingsley, *Madame How and Lady Why,*

pp. 97–115; Tyndall, *Forms of Water;* Tyndall, *Hours of Exercise in the Alps.*

Nature Study

METEOROLOGY: Continue the use of the thermometer, and rain-gauge and the weather record in the same manner as last month.

ASTRONOMY: Measure the noon slant of the sun every week, particularly on November 22d; compare with the slant on October 22d. Find the area of level ground covered by a beam of sunshine of given cross-section. Compare with the area covered by the same beam October 22. Compare the intensities of sunshine in the two cases. Compare also the average temperature of the two months.

ZOÖLOGY: Preparations of Animals for Winter. Observe in all possible ways the animals which are (1) escaping winter by migration; (2) preparing for winter by the growth of a winter coat and the storing up of food supplies, etc.; and (3) preparing to hibernate. Compare the first two classes in regard to organs of locomotion and coverings. Let the children collect and bring to the school-room as many varieties of small animals, snakes, toads, frogs, turtles, larvæ of insects, etc., as they can, and there watch their behavior as winter approaches.

Animal Movements: Study by means of pictures, visits to the zoölogical gardens, and museum specimens the organs of locomotion in various classes of animals. Notice what classes are adapted to migration. Study similarly the organs of prehension. Observe how the development of one pair of limbs as organs of prehension impairs their usefulness as organs of locomotion. Compare, in this particular, man, the monkey, the squirrel, the horse, and the bird.

Animal Coverings: Visit Lincoln Park and observe what animals have a new coat for winter, and how it differs in length, thickness, and color from the summer coat. Study the coverings of animals which live in (1) water; (2) in swamps; (3) on dry land; (4) in the air and trees. Make a careful study by means of specimens brought to class of (1) wool, (2) hair, (3) fur, (4) feathers. How does man make use of these?

Number Work

Use the data obtained in Nature study to solve the following problems:

1. Find the part of the days of October (expressed as a common fraction and as a per cent) which have been fair, cloudy, rainy, and frosty.

2. Find the total rainfall for the month. Find the part, expressed as a common fraction and as a per cent, which it is of the average rainfall for November.

3. Find how many times as great the area of level surface covered by a given beam of sunshine is as the cross-section of the beam itself. Find what part the intensity of sunshine on the level surface is of the intensity in a cross-section perpendicular to the direction of the beam.

4. What part (expressed both as a common fraction and as a per cent) of the animals observed migrate? What part grow winter coats? What part lay up a store of food? What part have coverings which are in some way useful to man?

5. Find the part the day is of the whole twenty-four hours. Find the part the night is. Find the daily and weekly changes in the length of the day. What part (expressed both as a fraction and as a per cent) is this of the whole day? Of the whole twenty-four hours?

Writing: How animals prepare for winter.

Oral Reading: Selections from *Redruff* in Ernest Seton Thompson's *Wild Animals I Have Known.*

Drawing: Diagram showing the noon slant of the sun October 22d and November 22d, and the areas covered by a beam of given cross-section on the two dates.

Rapid drawing of skeletons of fore limbs of man, monkey, squirrel, and horse.

Painting: November landscape. Animals in Lincoln Park, showing color of winter coats.

Making: Boxes needed for preservation of specimens and animals collected for observation of winter habits.

Music

Nutting Song, p. 162; *Autumn Song*, p. 140; *Harvest Song*, p. 66—all in *Second Book, Modern Music Series.* Harvest (hymn), *Songs of Life and Nature*, p. 186. *Spinning Song*, Modern Music Series, Third Book, p. 114. *We Plough the Fields*, Eleanor Smith's *Songs for Little Children*, Book 2, p. 24. *Wind Song*, Modern Music Series, First Book, p. 94; *The Months*, Modern Music Series, Primer, p. 62; *A Snowy Day*, Modern Music Series, Third Book, p. 174.

References

For Meteorology and Astronomy, see references for last month. For Animal Movements, Orton, *Comparative Zoölogy*, pp. 154–166; Chapman, *Bird Life*, pp. 14–34; Thomson, *The Study of Animal Life*, pp. 120–124; Jackman, *Nature Study in the Grammar Grades*, p. 334; Semper, *Animal Life*, pp. 101–117.

Sixth Grade

Edith Burnham Foster

History

The subject for the month is Marco Polo and the Routes of Trade. In this way the subject of China connects naturally with that of Venice and the other Italian cities which will be studied later in the year, and the history subjects for the year thus coördinate readily with Eurasia, the topic for the year's study in geography.

I. When did Europe first get full and authentic knowledge of China?

1. The Polos, Maffeo and Nicolo: *a*. Their first journey to China; *b*. Their embassy to the Pope; *c*. Marco Polo's journey; his services to the Great Khan; his travels; his book; its reception in Europe.

II. Europe's trade-relations with the Orient in the Middle Ages.

1. The Europeans imported silks, gold, precious stones, ivory, cashmeres, dyewood, perfumes, and spices. Of these, spices and silks were particularly desired. Woolens were the principal export.

2. Trade with the East was stimulated by the Crusades.

a. Venice and Genoa offered their fleets to transport soldiers and pilgrims and received trading privileges in Constantinople in return.

3. The routes of trade: *a*. The Northern, by the Black Sea, the Phasis, the Cyrus, the Caspian, the Oxus, and the Indus. *b*. The Middle: Through Syria and by way of the Euphrates and the Persian Gulf. *c*. The Southern: By way of the Mediterranean, Alexandria, and the Red Sea.

4. The Conquest, in the thirteenth century, of Constantinople by the Venetians and the leaders of the Fourth Crusade, and the consequent Venetian monopoly. *a*. The regaining of Constantinople, in 1261, by the Greek Emperor, with the aid of the Genoese, the consequent privileges granted the Genoese, and the forcing of Venice to the old Alexandrian route.

5. The closing of the routes of trade by the Turks and by the fall of the Mongol dynasty, and the consequent search for new routes. *a*. The Westward or Spanish route; *b*. The Eastward or Portuguese route. Prince Henry the Navigator; Diaz and Vasco de Gama.

References

Knox, *Travels of Marco Polo;* Thomas Wright, *Marco Polo's Travels;* Hugh Murray, *Travels of Marco Polo;* W. E. Griffis, *The Romance of Discovery;* Abbé Raynal, *History of Europeans in Indies;* John Yeats, *Growth and Vicissitudes of Commerce;* George Burton Adams, *Mediæval Civilization;* Charles Morris, *Civilization;* Robert Kerr, *Collection of Voyages and Travels;* Octave Nöel, *Histoire du Commeree du Monde;* John Fiske, *Discovery and Conquest.*

Dramatic Reading: *Rushan Beg*, by Longfellow.

Geography

The subject for the year will be Eurasia. The subject for the month is China.

Before proceeding to China the children will take a general survey of the topography of Eurasia, noting (*a*) the mountain regions, (*b*) the table-lands (*c*) the plain regions, (*d*) the coast-lines (*e*) the areas as compared with those of North America and of the United States. They will draw relief maps of the continent, and model some of the more obvious features in sand. After this the work will proceed somewhat as follows:

I. Situation of China: latitude and longitude; relations to mountains and sea.

1. What, therefore, are we to expect of its climate? Diversity (compared with United States); winds; rainfall.

II. Natural divisions of the country: 1. Mountain region; *a.* Situation; *b.* Systems; *c.* Extent; *d.* Height; *e.* Effect on rainfall.

2. Hilly region (south of Yang-tse).

3. Great plain: *a.* Origin; *b.* Extent; *c.* Fertility; *d.* Population; *e.* Products; *f.* Grand Canal.

4. River Systems: *a.* Hoang-ho in north. Higher than its banks, in places; results, floods; *b.* Yang-tse in center; *c.* Li in south; *d.* Direction; *e.* Length; *f.* Means of transportation afforded.

5. The loess: *a.* Theories as to its origin; *b.* Topographical features; *c.* Agricultural value.

6. Productions: Rice, wheat, barley, millet, and maize, in north; pulse, tobacco, cotton, hemp, opium, sugar-cane, tea, silk, camphor; coal resources.

References: J. Thomson, *Through China with a Camera;* W. and A. K. Johnston, *Atlas;* Johnson, *Universal Encyclopedia;* Wells Williams, *Encyclopedia Britannica, The Middle Kingdom;* Reclus, *The Chinese Empire;* Stanford, *The Chinese Empire.*

Number Work: Compare area of China with that of North America and United States, by ratio, percentage, and fractions. Compare river lengths, coast-lines, mountain heights, etc., in same way. Compare population and exports with those of the United States.

For painting, drawing, hand-work, etc., see History Outline for October.

Nature Study

The special study for October was the preparations of plants for the winter. The work for November will embrace certain relations between insects and plants, and the preparations for the winter of insects and other animal forms.

The children will first of all collect galls, distorted leaves, stems, and webs. After examining and discussing these and speculating as to their origin, they will proceed on somewhat the following plan:

1. The use of plants by insects: *a.* As food; parts attacked; effects. Time when they are attacked; results. Amount of injury done. Protective devices; hair, bristles, prickles, gum. *b.* As homes (miners, rollers). *c.* As depositories for eggs.

2. The preparations of animals for the winter: *a.* Insects: Depositing of eggs; making of cocoons, etc. *b.* Animals: Hibernation; lowering of vital functions; movement; circulation, respiration; source of nutrition; growth of extra covering; migration.

The children will make a collection of larvæ and watch their evolution during the succeeding months, and will, if possible, observe the hibernating habits of various animals.

Dramatic Reading: Poem, *Robert of Lincoln,* Bryant.

Number Work: (See Jackman's *Nature Study for the Grammar Grades,* pp. 3 and 4.)

Drawing: Drawing of typical injuries to leaves, etc., and of like parts uninjured.

Painting: The landscape calendar. Color modifications due to insect depredations.

Hand-work: Making of insect cage. Making of insect mounting board. For wood-work see Manual Training Outline.

Songs, *Harvest* (hymn). Songs of Life and Nature, p. 186; *Snowy Day,* Modern Music Series, Third Book, p. 174; *Nutting Song,* Modern Music Series, Second Book, p. 162; *He Prayeth Best* (2 parts), p. 32; *We Merry Minstrels* (three-part round), p. 15, Modern Music Series, Third Book.

References

MacMullen, *Population of an Old Pear Tree;* Badenoch, *Romance of the Insect World;* Lubbock, *Insects on Plants and Flowers;* Jackman, *Nature Study for Grammar Grades;* Jackman, *Nature Study and Related Subjects;* Encyclopedia Britannica.

Seventh Grade

Katharine M. Stilwell

History

ROME: THE REPUBLIC. I. How the Romans worked out self-government through the struggle between the patricians and plebeians.

1. The Social Struggle. Tribunate, Land Question, and Decemvirate.

2. The Political Struggle. The class will read on the above topics in the histories named in the Pupils' Reading List. The knowledge thus gained will be supplemented by the teacher's explanations.

II. Rome as mistress of Italy.

1. How Rome conquered the mountain peoples, repelled the Gauls, and finally conquered the various tribes of Italy. Conditions will be presented from which the class will draw inferences. Some reading also will be done on the above topics.

2. The Unity of Italy.

III. Rome's Conquest of the World.

1. Rome and Carthage — the West. (*a*) The Punic wars (map of territory); causes; immediate pretext; comparison of combatants; leaders; result. (*b*) Effect in Italy upon the social, moral, and political conditions.

2. Conquest of the East.

Children's Reading List: Harding, *City of Seven Hills;* Creighton, *Rome*, pp. 11–35; Gilman, *Story of the Nations — Rome*, chap. 4; Ihne, *Early Rome*, pp. 112–126; Sewell, *History of Rome*, pp. 39–64; Smith, *Smaller History of Rome*, pp. 35–63; Cotton, *Young Folks' History of Greece and Rome;* Yonge, *Rome;* Guerber. *Story of the Romans.*

References

Pelham, *Outlines of Roman History;* Mommsen, *Rome;* Duryea, *History of Rome;* Myers, *History of Rome;* Liddell, *History of Rome:* How and Leigh, *History of Rome;* Shucksburg, *History of Rome;* Livy, *Punic War.*

Geography

The Continent of Africa.

1. Our relation to Africa. Current news of Africa. Read *Current History, The Outlook, The Great Round World,* etc. Relation of other countries to Africa.

2. Location: Direction from us. Distance. How to get there. Time necessary. Its location with regard to other continents.

3. Size: Shape, length, width, area, coastline, average height compared with other continents. Effect of these features on the history of the country.

4. Surface: Model in sand the mountains, plateaus, rivers, lakes, and plains. Compare with other continents.

5. Character: Locate desert regions. (See October Outline.) Locate regions of greatest rainfall and monsoons. Locate highest and lowest average temperature. Where is the sun at noon to-day in North Africa? In South Africa? (Correct the judgment of climate by use of Longmans' Atlas.)

6. Locate forests. Locate the animal life of the continent.

7. The people: Their life and industries. The natives. The principal cities. Where are the possessions of the chief powers?

Draw relief map of the continent. Draw or paint typical landscapes, characteristic occupations and types of people.

Children's Reading: McCabe, *Our Young Folks in Africa;* Kingston, *In the Wilds of Africa;* Manning, *The Land of the Pharaohs; Scribner's Geographical Reader;* Heawood, *Geography of Africa;* Knox, *Boy Travellers in Egypt;* Longmans, *School Geography; Young Folks' Cyclopedia of Persons and Places.*

References

Reclus, *Bird's-eye View:* Encyclopedia Britannica; Stanford *Compendium of Africa;* Reclus, *The Earth and Its Inhabitants;* Brown, *Countries of the World: Africa;* Vincent, *Actual Africa;* Guyot, *Earth and Man;*

Ratzel, *History of Mankind*, Vol. II; Stanley, *Through the Dark Continent;* Stanley, *The Congo;* Keltie, *Stanley's Letters;* Hinman, *Physical Geography;* Keipert, *Manual of Ancient Geography;* Macturk, *Africa;* Marsh, *Earth as Modified by Human Action;* Ritter, *Comparative Geography.*

Nature Study: I. Study of weather conditions continued as indicated in the October Outline.

II. Following the distribution of seeds, the pupils will account for that part of the plant which seems to decay by studying the Chemistry of Decay.

1. What is in the plant?

[See Directions for Laboratory Work.]

The pupils will average the class results of the experiments and represent these proportions on a piece of wood one meter long, one centimeter wide, and one centimeter thick. They will then discuss the following points:

What is decay? Where did the tree get all these elements? What becomes of each when the leaves decay? What agent decomposed the leaves in the experiment? What agent does this work out of doors? When does this take place? What would be the effect if these elements were all given off now? What do you think of this as a provision of nature?

Weigh and dry twigs. Weigh again. What per cent is water? What per cent is gas? What per cent is ash? What per cent is potash?

Select a block of wood in the sloyd shop. Measure out in bottles the amount of water, ash and potash found in this block.

In a tree containing 8,000 cubic feet, how many gallons of water? How much ash? How much gas? How much potash? Draw to a scale, showing these proportions. Name the source of each element. How did the tree get the mineral matter from the soil?

In six gallons of water there is one gram of solid matter. (See City Water Office Report.) What amount of new material has been added to the tree? (Measure new growth.) How many pounds of ash are there in each 100 pounds?

If each gallon of water supplies one gram of ash, how many gallons are needed to supply the ash in this year's growth on this tree? How many barrels? What size tank is needed to contain this water? Draw to a scale.

III. All leaves do not decay immediately on falling. The pupils then will take up the study of Fossils.

1. Fossil Plants: Evidences that the fossil was once a plant.

2. How it became a fossil. *a.* Examine rock, stratified, made by water; fine material, silt deposited by still water. *b.* What became of the plant? Casts, imprints, petrifications. Picture with clay the process of fossilization.

3. Conditions under which a plant must have lived. (Same that plant life demands today.) Picture the appearance of the earth at that time.

4. Subsequent events. Teacher draw fossil beds at Mazon Creek, Ill. Limestone layer 12 feet thick. In a stream 60 feet below the limestone were found the fossils. *a.* How did they get there? *b.* What has happened since? (building period; wearing period.) Probable length of each?

5. What the fossil teaches us. *a.* About the past: age of the world; former appearance; changes gradual. *b.* The probable future. Drawing to illustrate experiments. Painting of fossils.

References: *Chemistry.* Hooker's Chemistry, p. 313; Stockhart's Chemistry, p. 435; Popular Science Monthly, Nov. 1879, *Respecting Rubbish;* Murche, Vol. III, *Object Lessons in Elementary Science;* Conn, *Story of Germ Life; Decay.*

Directions for Laboratory Work

Laboratory Lesson.—To find what is in the plant.

(In all laboratory work, make careful, definite notes.) Ask no questions in the laboratory.

Directions for Experiment.—Weigh 20 grams of leaves. Put in tin pan on standard, about 3 inches above the flame. (See that you have a clear blue flame from Bunsen burner. Strike match at the side of the box on the end of the table.) Carefully note results. What does the flame prove? What do the sparks prove? Weigh what is left. What per cent has disappeared? What kind of material is left? Preserve it for a later experiment. Write results of this experiment.

Laboratory Lesson.—To find what is in the leaves.

DIRECTIONS FOR EXPERIMENT.—Break into small pieces and weigh enough leaves to fill two-thirds of a clay pipe. Cover with a piece of filter paper. Seal the pipe with a thick paste made of plaster of paris and water. Place the pipe in the hole in the wire gauze on the standard, about three inches above the flame. When smoke issues from the end of the stem, test with a lighted stick. Repeat several times at short intervals. Carefully note results. Hold a piece of clean glass in the smoke. What is the result? Test with red and with blue litmus paper. When smoke ceases, cool the pipe, uncover, and empty it. (Be sure to mix no plaster of paris with contents of the pipe.) Examine and weigh the contents. Sum up the experiment. State the results and make inferences from each. Read on the wood the alcohol, creosote, and tar. (See references.) Tell the class how they may prove the presence of N.

LABORATORY LESSON.—DIRECTIONS.—Use the ash left in the first experiment. Filter the water through this ash. Test filtrate with litmus paper. Evaporate the filtrate. Examine the contents of the filter paper. Test some of this residue with H. C. L.

Sum up the results of the experiment. What have you proved by each step?

Mathematics: As indicated in outlines, number will be used in correlation with the other subjects.

Simple exercises in algebra will be given.

Oral Reading: See Miss Fleming's outline.

Study of poems: *Virginia*, by Macaulay; *Down to Sleep*, by Helen Hunt Jackson; *The Petrified Fern*.

Latin: The life of the Romans will be continued. This study will be supplemented by simple reading lessons in Latin. See printed slips. Grammatical forms will be learned as they occur in these reading lessons.

Gymnastics: See Mr. Kroh's outline, p. 221.

Sloyd: This month the pupils will begin making Christmas presents. Each pupil, with the assistance of the teacher, will select his own work. Plans will be drawn, and amount of material, with cost, computed before the shop work is done.

Industrial Art: Sewing and weaving.

School Economics — Continued. See Mrs. Norton's outline, p. 207.

Music: *Harvest* (hymn), Songs of Life and Nature, p. 186; *Snowy Day*, Modern Music Series, Second Book, p. 162; *Nutting Song*, Modern Music Series, Second Book, p. 162; *He Prayeth Best* (two parts), p. 32; *We Merry Minstrels* (three-part round), p. 15, Modern Music Series, Third Book.

Latin

The history lesson preceding has for its subject some feature of Roman life. This is to be supplemented by the Latin reading lessons which follow.

Pictures of the various objects mentioned will be presented and their Latin names written on the blackboard.

Grammar is to be taught only as an aid in interpreting and expressing thought. The system of grammar used is that of Professor Hale, of the University of Chicago.

The books used for suggestions on private life are: Becker, *Gallus;* Wilkins, *Roman Antiquities;* Preston and Dodge, *Private Life of the Romans;* Harper's Classical Dictionary; Rich, Dictionary of Greek and Roman Antiquities.

Reading Lesson

1. Puella bullam gerit.
2. Bulla injūriam āvertit.
3. Bullæ puellās dēfendunt.
4. Puellæ tunicās gerunt.
5. Fībula tunicam cōnectit.

Vocabulary

NOUNS

puella—girl.
bulla—amulet.
fibula—clasp.
tunica—dress.
injuria — harm. (cf. injury.) (cf. confer= compare.)

VERBS

gerit—wears.
avertit—wards off. (cf. averts.)
defendit—(cf. defends, protects.)
conectit—(cf. connects, fastens.)

CONJUNCTION

et—and.

Points to be Made

1. Roman way of expressing an idea. Order of words in a sentence.
2. The omission of the article.
3. Nominative and accusative nouns, singular and plural, first declension.
4. Verbs, third conjugation; present, third, singular and plural.
5. Conjunctions.
6. Pronunciation.

To be Translated into Latin

1. The girls wear amulets.
2. The amulet protects the girl.
3. Clasps fasten the dress.
4. The girl wears the amulet and the tunic.

Reading Lesson

1. Puella tunicam albam gerit.
2. Et tunicam et soleas gerit.
3. Geritne puella violās?
4. Puellæ bullās et armillās pulchrās gerunt.
5. Palla longa tunicam albam tegit.

Vocabulary

NOUNS	VERB
armilla—bracelet.	tegit—cover.
palla—mantle.	
viola—violet.	
solea—sandal.	
ADJECTIVES	CONJUNCTIONS
alba—white.	et, et—both, and.
pulchra—beautiful.	
longa—long.	

Points to be Made

1. Subject in the verb.
2. Adjective to modify subject and object.
3. Order of adjectives in the sentence.
4. The interrogative sentence.

To be Translated into Latin

1. The girls wear pretty violets.
2. Does the mantle cover the dress?
3. The girl clasps her bracelet.
4. She fastens her sandals.

Reading Lesson

1. Vīlla est māgna.
2. Vīlla est rūstica.
3. Tua vīlla est pulchra, sed mea vīlla est māgna.
4. In meā villā est bibliothēca.
5. In meā villā est culīna. Culīna est parva.
6. Mea serva Julia, cēnam coquit.

Vocabulary

NOUNS	ADJECTIVES
villa, house.	rustica, country.
culīna, kitchen.	mea, my.
bibliothēca, library.	tua, yours (to one person).
serva, servant.	magna, barge.
Julia, Julia.	parva, small.
cēna, dinner.	bona, good.
CONJUNCTIONS	VERBS
sed, but.	est, is; sunt, are.
ADVERBS	coquit, cooks.
cur, why.	PREPOSITION
non, not.	in (with abl.), in.

Points to be Made

1. Predicate adjective.
2. Nouns in apposition.
3. Adverbs.
4. Ablative (locative) case.
5. Preposition.

To be Translated into Latin

1. Is the country villa a large one?
2. In my villa are a library and a kitchen.
3. Is the library pretty?
4. In your house is a large kitchen, but my kitchen is a small one.
5. My servant, Julia, is a good servant, and she cooks a good dinner.

Reading Lesson

1. In villā sunt statuæ.
2. Statuæ sunt multæ.
3. Statuæ sunt marmoreæ.
4. Mēnsæ et sellæ et lectīculæ sunt in villā.
5. Aliæ mēnsæ sunt marmoreæ, sed aliæ sunt citreæ.

Vocabulary

Nouns	Adjectives
statua, statue.	multa, many.
mensa, table.	aliæ, aliæ, some, others.
sella, chair.	marmorea, marble.
lecticula, small bed.	citrea, citrus-wood.

Adverb

maxime.

Points to be Made

General review.

Eighth Grade

Nott William Flint

History

The class will trace the history of Illinois, beginning with the present time and working backward. In studying the industries of Illinois the differences between rural and city life and the modern tendency toward urban life will be dwelt on. In considering farm life, and the topography of the state, Nature Study and geography will correlate with and reinforce the History. The comparison of areas and questions of population will yield many problems for number work.

1. Topography: (Outline topography of Illinois in sand.) *a.* Area: Comparison of Illinois with European countries. *b.* Character of soil; rivers; slope of land; climate; rainfall.

2. Industries: *a.* Agriculture: Corn and other cereals; fruits; vegetables.

3. Commerce: *a.* Railroads: Names and miles of railroads. History of railroads in Illinois. (See railroad map.) Original state roads. *b.* Canals. *c.* Lake shipping: Chicago as a port. *d.* Manufactures: City life vs. rural life.

4. Cities of Illinois: Growth of cities and urban life. Study of conditions which make cities.

5. People: *a.* Present population? Composed of what? (Census 1900.) Population in cities and in rural districts. (See United States Census statistics.) *b.* Population in each census year? *c.* Social customs; farm life in Illinois. *d.* Lines of immigration: Early settlers; Indians; Tribal divisions of Algonquins; Whites vs. Indians; Civilization vs. Savagery.

6. Education: State system; State University; State Normal schools; District schools; Denominational and private schools; city system.

7. Government: Present State government. *a.* Legislative. (Pupils will organize themselves into a Senate and House.) Method of choosing representatives. *b.* Executive. *c.* Judicial. *d.* Limitations upon State government. *e.* State taxation. *f.* Illinois in Civil War; Lincoln and Douglas. *g.* Territorial government prior to 1818. *h.* Illinois under Virginia. *i.* Comparison of State government system with municipal.

References: Moses, *History of Illinois;* Kirkland, *History of Illinois;* McKinney, *Indian Tribes;* Patterson, *Early Society in Southern Illinois; United States Census for all years.*

Geography

Continuing the work of October—rivers of the world—the class will, in November, study the Mississippi, and, to relate the work to the history for this month, the valleys of the Illinois and Wabash. Computations of the volume of water flowing down these rivers and of their corrasive power will furnish problems in number work. The making of relief maps of Illinois and Indiana and the modeling of them in sand will furnish hand-work.

1. The Mississippi: (Model of valley in sand; also chalk model in class-room); length. Volume. Rate of flow. Flood plain. Ox-bows. Formation of delta.

2. The Illinois and its tributaries: A geog-

raphy of Illinois. Boundaries and extent. Slope of land. Elevation. Lakes. Character of soil. Minerals: coal, lead, zinc, limestone and sandstone. Climatic ranges. Rainfall.

3. The Wabash and its tributaries. (Model of the valley of the Wabash in sand.) Comparison of Whitewater and Kankakee rivers. Geography of Indiana. Same as for Illinois.

References

Chas. R. Dryer, *Geography of Indiana; Johnston's Universal Cyclopedia;* Alex. Frye, *Geography; International Geography.*

Nature Study

Last month the class studied the distribution of seeds by nature; for November the subject will be the distribution and transportation of seeds by man, and the chemistry of decay. In comparing the extent of food-producing areas, and the cost of crops, in calculating cost of transportation, in finding the cost of preparation of food, the subject will yield many problems in number work. Also in connection with the study of crops the pupils will be encouraged to work out and formulate Ricardo's theory of rent. For hand-work the pupils will make various insect boxes and seed cards, and also perform experiments. For other manual training, see Manual Training Outline, p. 217.

I. Crop Areas.

After studying climatic conditions and the localities from which the different crops are harvested, the pupils will make crop maps of the different countries of the world. In these maps the conditions which make each district suitable for certain crops will be indicated.

1. Harvesting: Methods and reasons for harvesting the different food products. Special study of wheat. Comparison of old and new methods: the method of harvesting wheat on a California farm vs. the method of harvesting hemp in the Philippines.

2. Transportation: (*a*) Wagons; (*b*) Canal boats; (*c*) Railroads; (*b*) Ships.

II. Chemistry of Decay:

The class will study this subject by experimentation. So far as possible each pupil will experiment with a different material from his neighbor's.

1. Effect of heat, cold, and water as agents of decay.

For experiments see Jackman's *Nature Study.*

References

Jackman, *Nature Study and Related Subjects;* Jackman, *Nature Study for Grammar Grades;* Chisholm, *Handbook of Commercial Geography; Album of Agricultural Graphics;* W. K. and A. J. Johnston, *Atlas.*

Music: *Harvest* (hymn), Songs of Life and Nature, p. 186; *Snowy Day,* Modern Music Series, Third Book, p. 174; *Nutting Song,* Modern Music Series, Second Book, p. 162; *He Prayeth Best* (two parts), p. 32; *We Merry Minstrels* (three-part round), p. 15, Modern Music Series, Third Book.

Morning Exercises

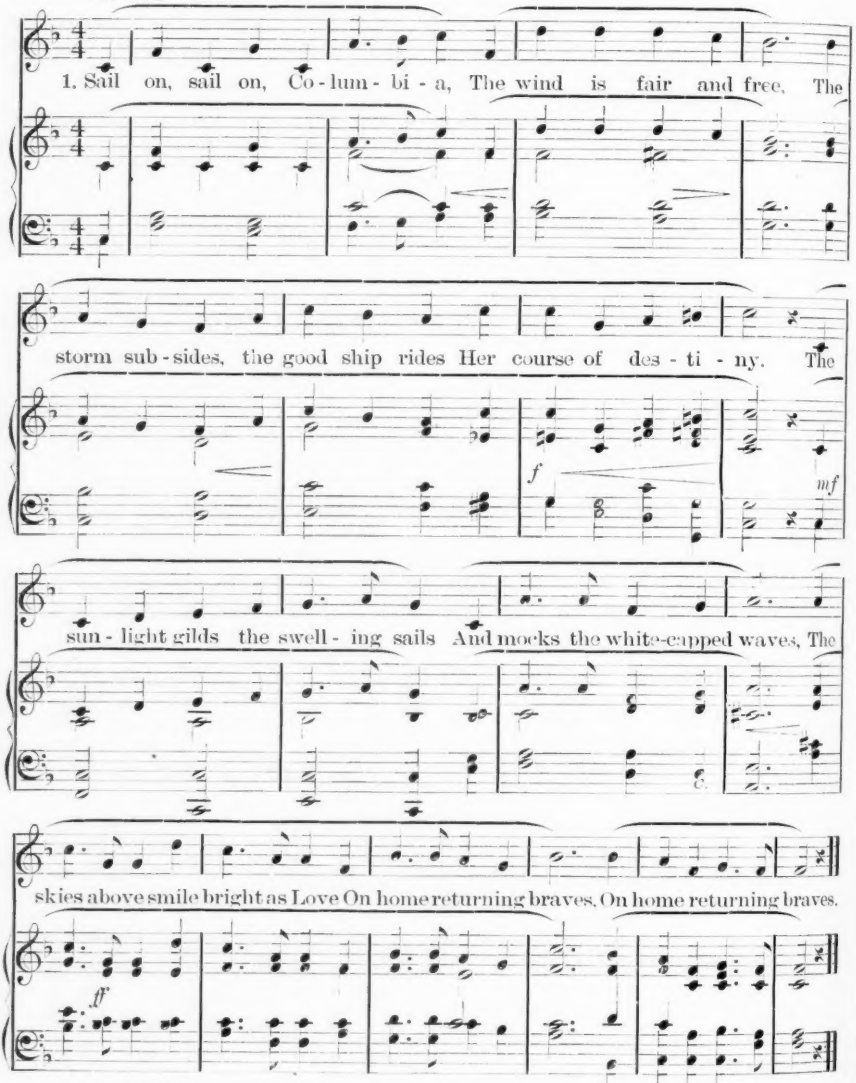
	SUBJECT.	LEADER.
OCTOBER.		
30.	Art	Mr. Duncan.
31.	Halloween	Miss Cooke.
NOVEMBER.		
1.	Speech	Miss Fleming.
2.	November	Miss Chmplin.
6.	Goethe and the English Literature	Dr. Benignus.
7.	A Trip to Stony Island	Mr. Bass.
8.	Current Literature	Mr. Gould.
9.	Science Observations	Mr. Jackman.
13.	The November Meteors	Mr. G. W. Myers.
14.	Book-binding	Miss Warren.
15.	Books	Mrs. Marion Foster Washburne.
16.	Myths and Stories	Gudrun Thorne-Thompsen.
20.	Result of Field Trips	Mr. Atwood.
21.	Children of Italy	Miss Payne.
22.	The Pilgrims in America	Miss Crawford.
23.	Science Observations	Mr. Carmen.

Historical Events and Birthdays

November	1	Lydia Huntley Sigourney	1791
"	3	Wm. Cullen Bryant	1794
"	5	Guy Fawkes' Day	
"	6	John Bright	1811
"	9	Oliver Goldsmith	1728
"	10	Friedrich Schiller	1759
"	14	Sir Chas. Lyell	1797
"	15	Wm. Pitt	1708
"	15	Wm. Cowper	1731
"	15	Sir Wm. Herschel	1738
"	15	Articles of Confederation Adopted	1777
"	18	Robin Hood's Day	
"	19	Jay's Treaty	1794
"	19	Thorwaldsen	1770
"	24	Grace Darling	1815
"	29	Sir Philip Sidney	1554
"	30	Jonathan Swift	1667

SAIL ON, SAIL ON, COLUMBIA!

WILLIAM E. ANDERSON. Mrs. CROSBY ADAMS.

Joyously. VOICES IN UNISON.

1. Sail on, sail on, Co - lum - bi - a, The wind is fair and free, The
storm sub - sides, the good ship rides Her course of des - ti - ny. The
f
mf
sun - light gilds the swell - ing sails And mocks the white-capped waves, The
skies above smile bright as Love On home returning braves, On home returning braves.
ff

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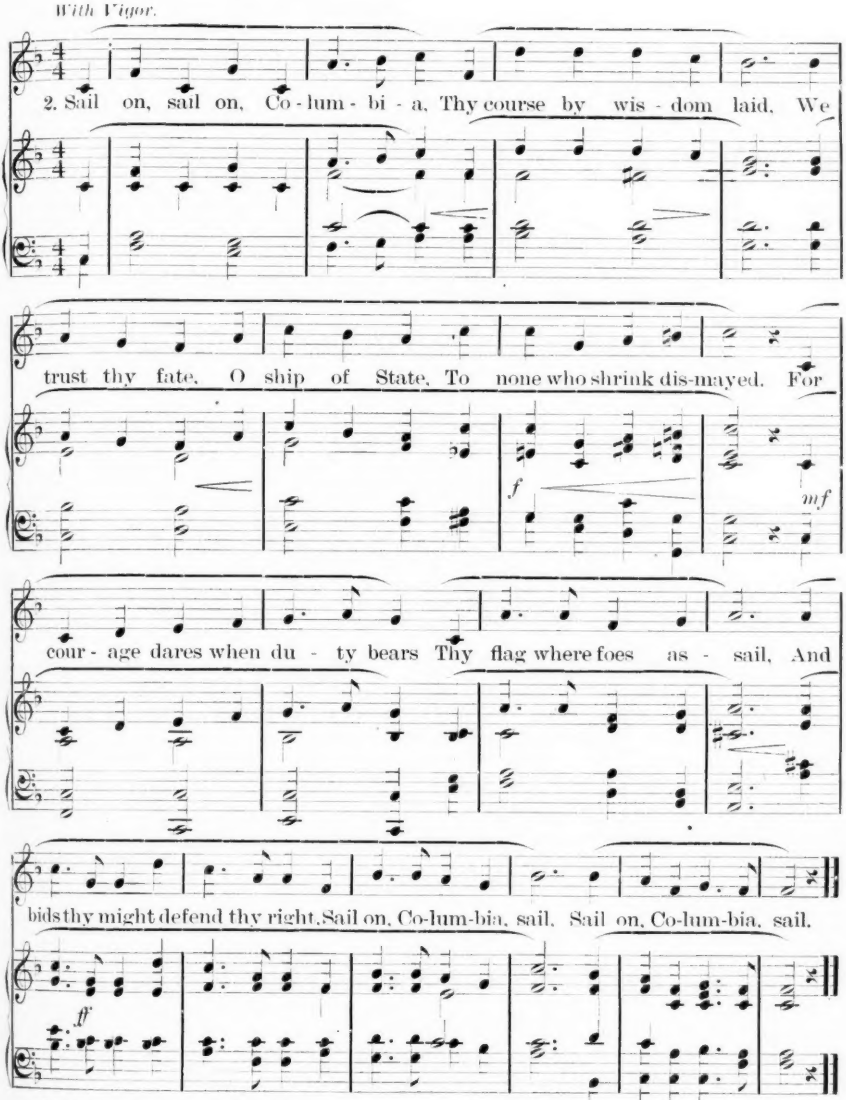
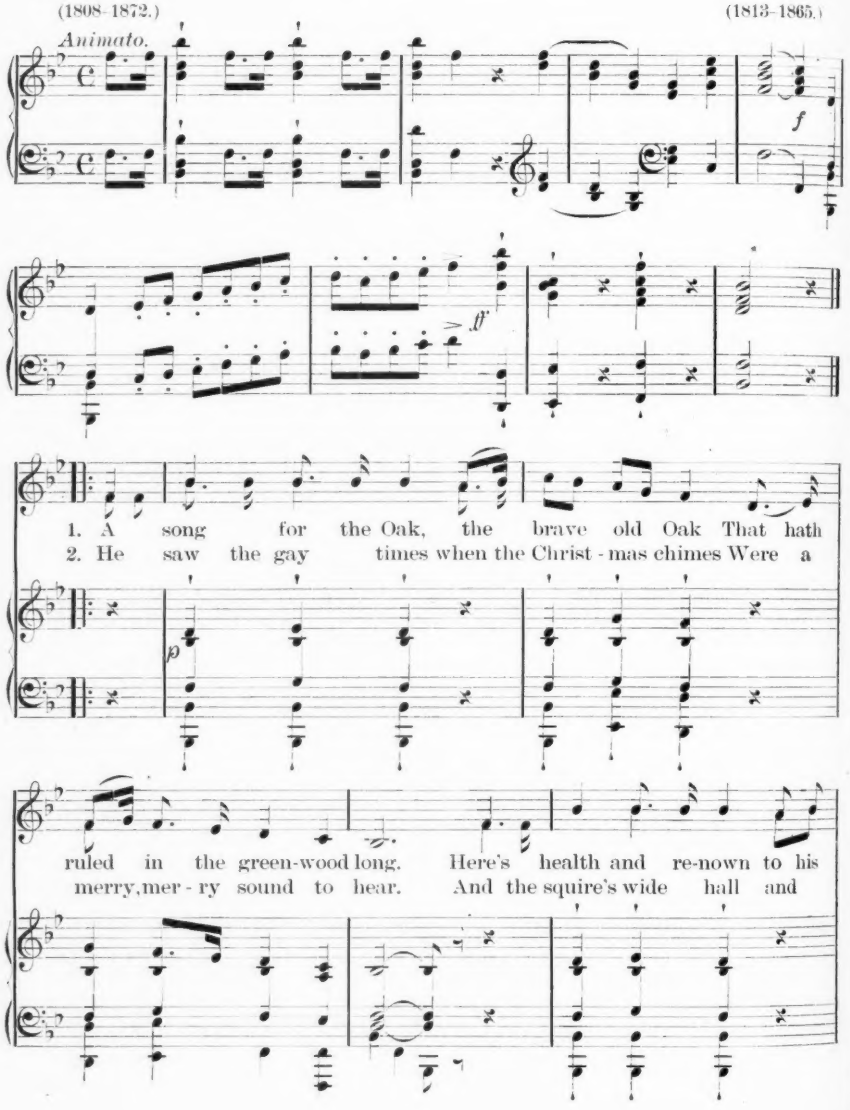

With Vigor.
2. Sail on, sail on, Co - lum - bi - a, Thy course by wis - dom laid, We
trust thy fate, O ship of State, To none who shrink dis-mayed. For
f
mf
cour - age dares when du - ty bears Thy flag where foes as - sail, And
bids thy might defend thy right, Sail on, Co-lum-bia, sail. Sail on, Co-lum-bia, sail.
ff

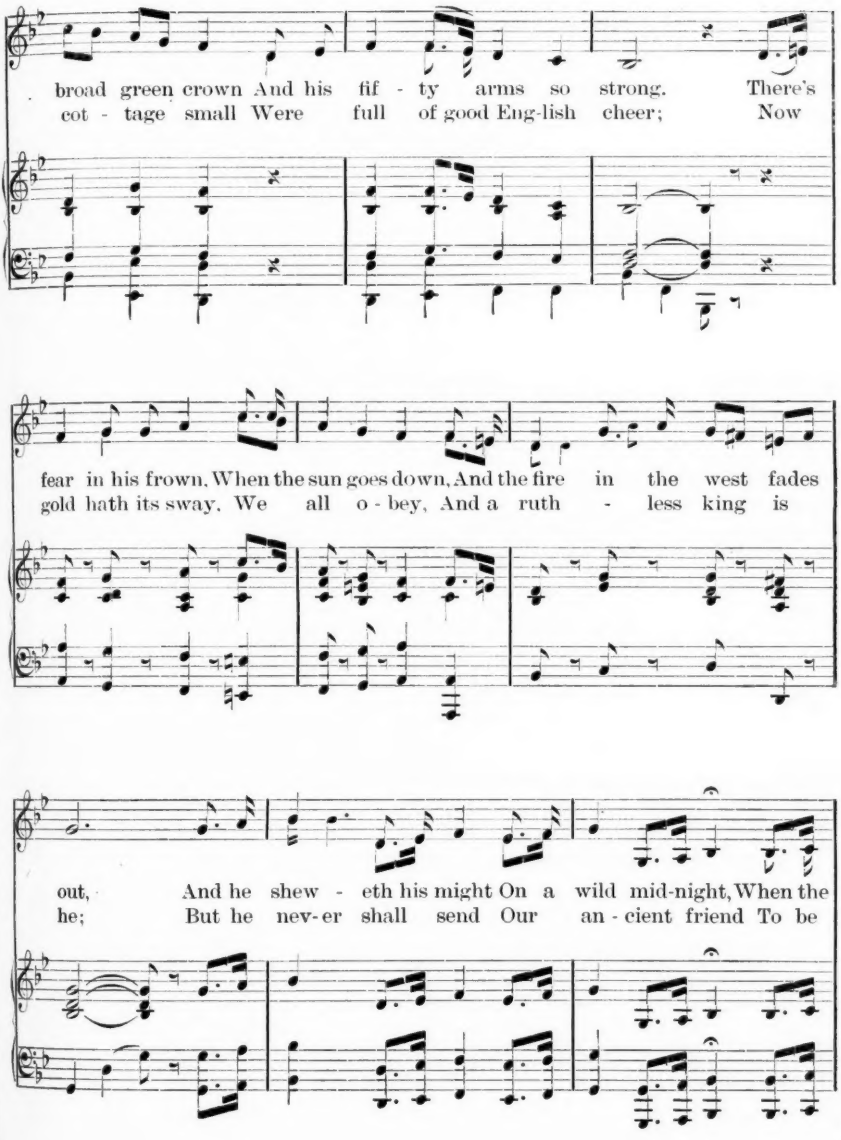
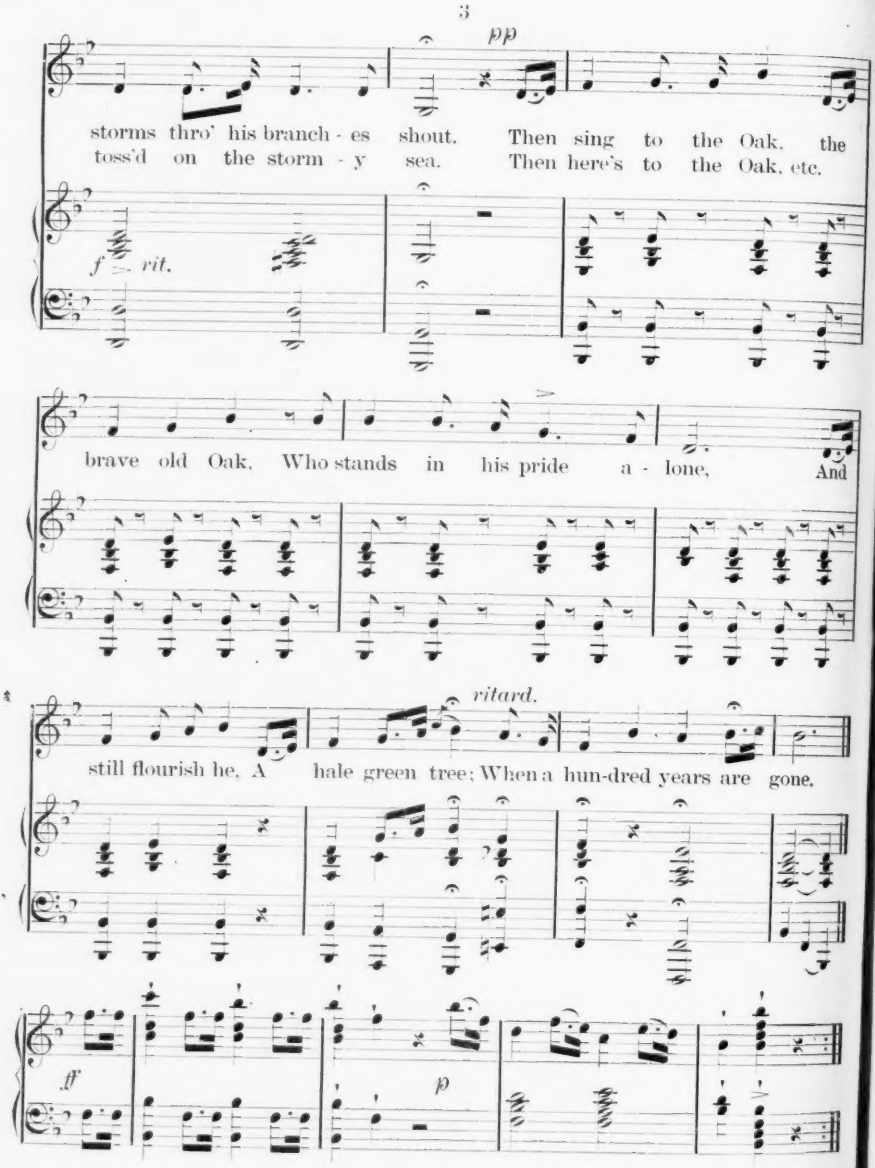
3 Sail on, sail on, Columbia;
All lands shall welcome thee;
Thy flag unfurled to all the world,
Brings hope of Liberty.

And may the God of Nations hold
Thee safe when storms prevail;
And keep the lights which guide thee right,
Sail on, Columbia, sail.

THE BRAVE OLD OAK.

H. F. CHORLEY. (1808–1872.)

E. J. LODER. (1813–1865.)

Animato.
f
ff
1. A song for the Oak, the brave old Oak That hath
2. He saw the gay times when the Christ - mas chimes Were a
p
ruled in the green-wood long. Here's health and re-nown to his
merry, mer - ry sound to hear. And the squire's wide hall and

2

broad green crown And his fif - ty arms so strong. There's
cot - tage small Were full of good Eng-lish cheer; Now
fear in his frown, When the sun goes down, And the fire in the west fades
gold hath its sway, We all o - bey, And a ruth - less king is
out, And he shew - eth his might On a wild mid-night, When the
he; But he nev-er shall send Our an - cient friend To be

3
pp
storms thro' his branch - es shout. Then sing to the Oak, the
toss'd on the storm - y sea. Then here's to the Oak, etc.
f
rit.
brave old Oak, Who stands in his pride a - lone, And
ritard.
still flourish he, A hale green tree; When a hun-dred years are gone.
ff
p